

A CHILTON

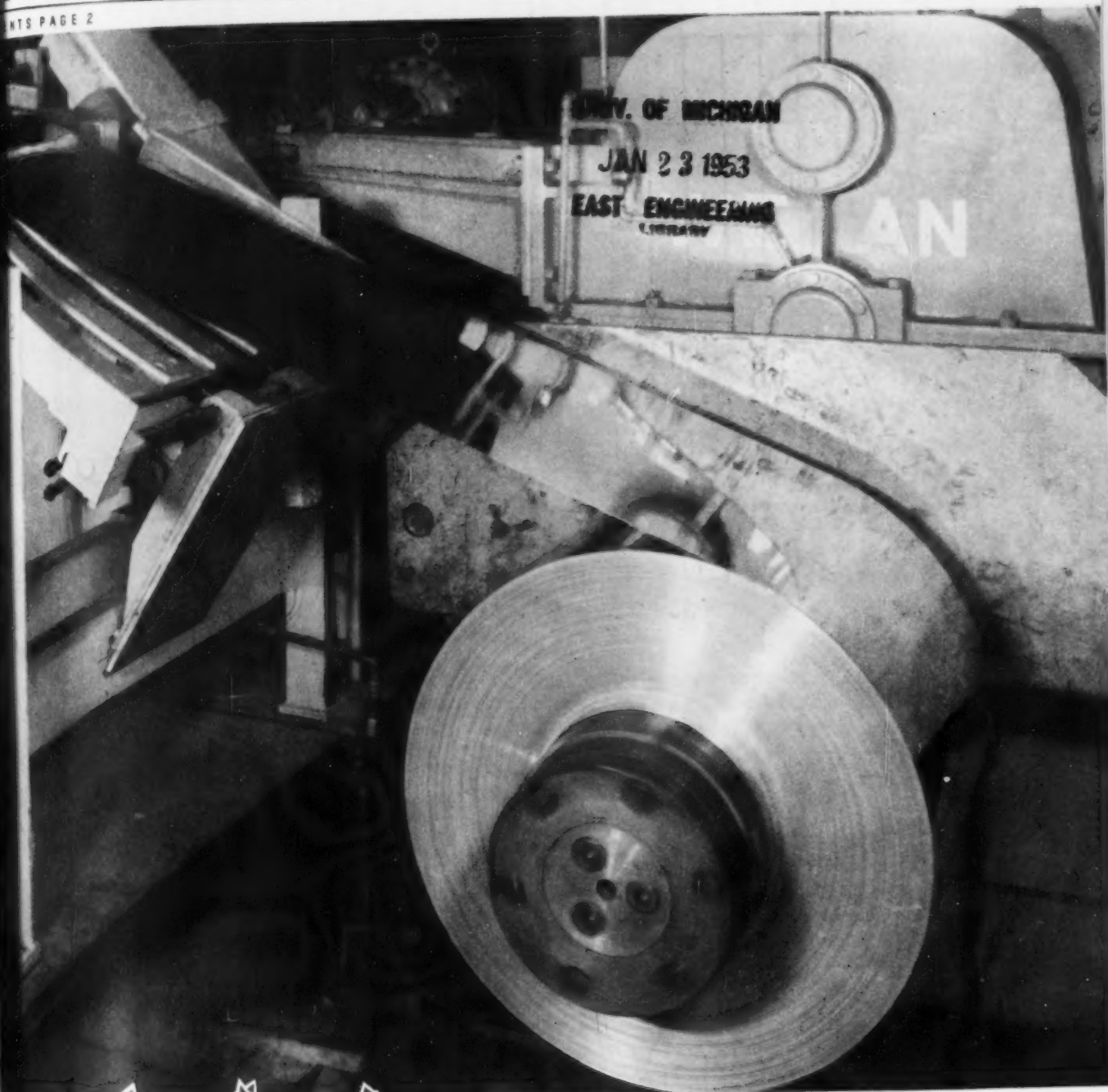
PUBLICATION

# The Iron Age

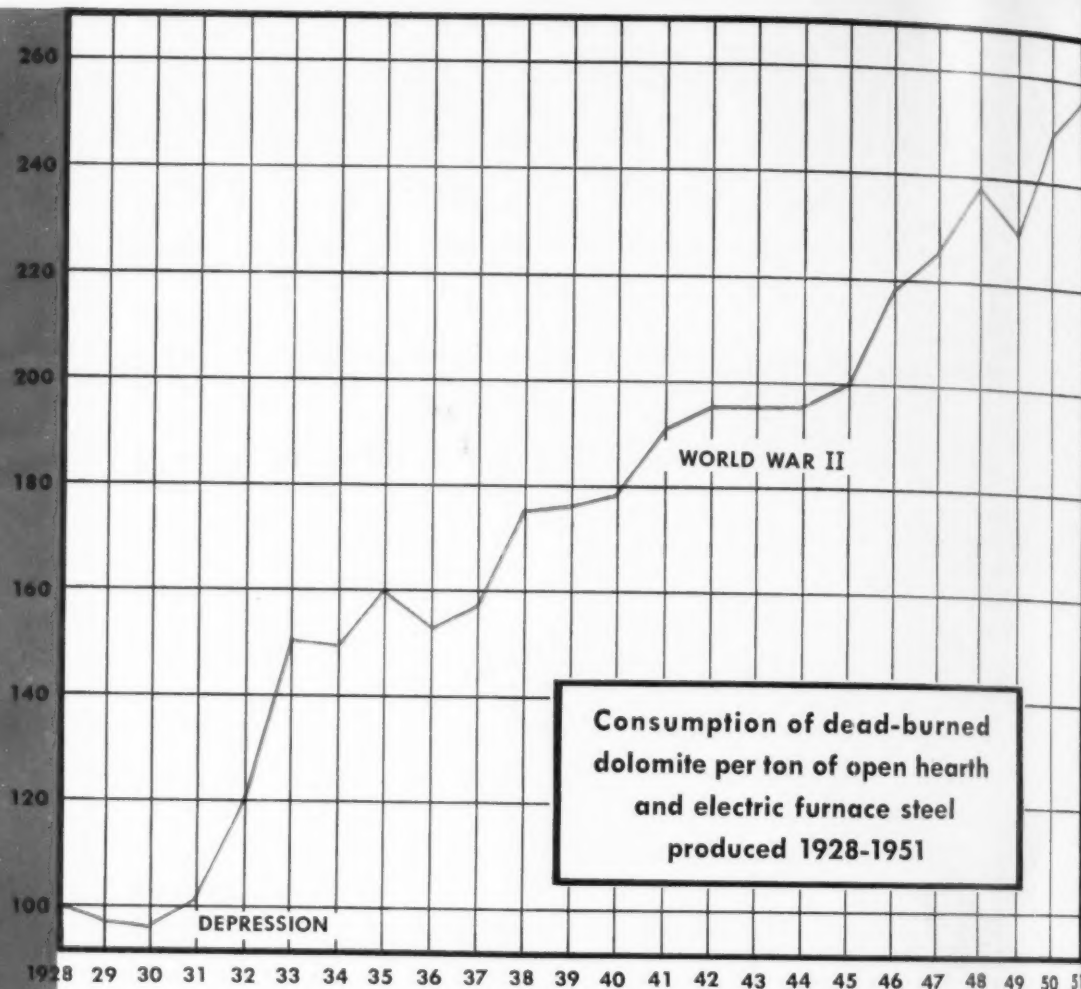
NATIONAL METALWORKING WEEKLY

January 22, 1953

ENTS PAGE 2



ENGINEERING  
COMPANY, Inc.  
WARREN OHIO



## the uptrend in dead-burned dolomite

**T**HIS chart presents a graphic picture of the trend in fettling refractories. Taking as a base period 1928, the first year for which industry figures are available, it indicates the increase in consumption of dead-burned dolomite per ton of steel produced annually through 1951.\*

Dead-burned dolomite was developed as a substitute for Austrian magnesite in 1914. At that time it was generally thought that the product would disappear when European shipments could be resumed. However, product and process research resulted in such improvement in quality and cost that the use of dead-burned dolomite climbed steadily throughout the 1920s. The trend gained impetus as a consequence of efforts of steelmakers through the depression

years to take greater advantage of the economies promised through the increased use of dead-burned dolomite.

Despite the consistently upward trend of 24 years, and the fact that the steel industry utilized slightly over 1 3/4 million tons in 1951, there have been few times since the late '30s when the supply of dead-burned dolomite was sufficient to permit any major shift to it by users of other fettling materials. Now for the first time in 10 years, with two new kilns in operation at our Ohio Works, there are adequate supplies available for any steel producer who wishes to convert to dead-burned dolomite practice or to improve his present practice through the use of more of this quick-setting, dependable, low-cost refractory.

\*Each year's figure expressed as percentage of base period.



**Basic Refractories Incorporated**

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**Write for free booklet "Underlying Steel".** This graphic booklet tells the story in words and pictures of granular basic refractories and their role in the production of open hearth steel. Address Dept. 14.

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## Editorial

The Iron Age

FOUNDED 1855

## The Silk Top Hat

WE are creatures of habit. Tell us that the clam fork should be on the right and we put it on the right. Tell us that the best thing to serve at a public dinner is fried chicken and we do it—even though 90 pct of us will struggle with implements to get at the meat.

Tell us that the latest rule of etiquette is to put a lemon slice in the finger bowl and many of us do it. In many ways we are really silly with our ideas of "the right thing to do."

It is true that some people do the unorthodox thing because they are exhibitionists. Perhaps they can't make the grade and get the applause one way so they try to get it some other way; like living in a tank; sitting on a flag pole; or wearing a lit-up bow tie.

But there are millions of people who do things because there is a principle involved; because they will not be a slave to tradition.

There are many who would rather be right and still be president. This week the American people saw the result of their explosion of wrath at the way things were going. They chose a real leader.

Some are saying that President Eisenhower is naive; that he has a lot to learn; that he is not a practical politician; that many of his so-called friends will give him the heave ho when it suits their purpose. What about it?

If being naive is to strive for what is right the people are with Ike. If being an unpractical politician means a new approach that's all right with the people too. If his conservative friends try to give him the heave ho in quiet or in public while he lives up to leadership quality, heaven help them.

When Ike decided to wear a homburg at his inauguration instead of the tall silk hat—which the experts say is a must—he was not using a good trick, or being a good politician, or worrying about "doing the right thing." He was being himself. He knows people from rubbing elbows with them; he knows about decisions from making them; he knows about problems from having them; he knows about pressures—all kinds—from surviving them.

Make no mistake about it whether you be businessman, wage earner, consumer, Republican, Democrat or just plain ornery—the rejection of the silk top hat was an augury of good things to come. Good for the country as a whole, that is.

Tom Campbell

Editor

January 22, 1953



*This announcement appears for purposes of record only. These Bonds were placed privately through the undersigned, and have not been and are not being offered to the public.*

**\$148,000,000**

## Reserve Mining Company

**First Mortgage 4 $\frac{1}{4}$ % Bonds, Series A**

**Due June 1, 1980**

**Glore, Forgan & Co.**

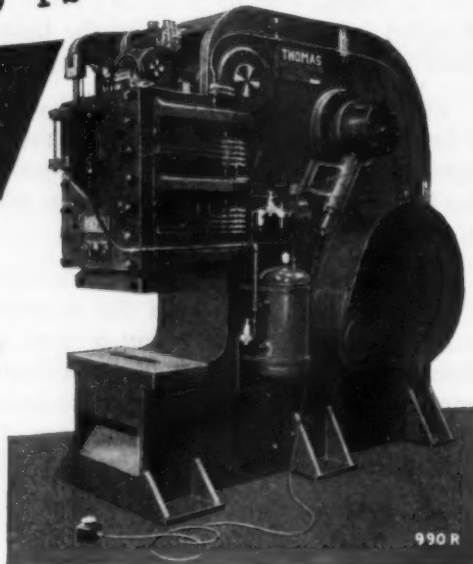
**Smith, Barney & Co.**

January 12, 1953

## THE TREND IS TO THOMAS

*because of these  
plus features!*

- Steel Plate Housing
- + Cast Steel Cut Gearing
- + Cast Steel Moving Parts
- + Air Operated Clutch
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- + Quick Tool Changes



*This Thomas All-Steel Punch or Shear has shearing or punching attachments which may be interchanged in a matter of minutes*

**For rounds, squares, flats,  
angles or channels**

**THOMAS**  
MACHINE MANUFACTURING COMPANY

PITTSBURGH (23), PA.

**PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES**

## Dear Editor:

*Letters from readers*

### Distant Support

Sir:

In the attached copy of our Ewa Hurri-Cane we quoted your editorial "A Businessman's Creed" and must apologize for doing so without permission.

Having read your outstanding editorials for sometime, I felt that you would welcome further dissemination of what you think is right and proceeded on that basis. Please accept our thanks now.

J. N. ORRICK  
Manager

Ewa Plantation Co.  
Ewa, Hawaii

### Thank You

Sir:

If you have a separate reprint of the Metal Industry Facts section which appeared in your Jan. 1 issue we would appreciate your sending it to us.

We would also like to take this opportunity to compliment you and your staff for a job well done.

D. MARINGAS  
F. P. Walther, Jr. & Associates  
Boston

Sorry we don't have a separate reprint of the Metal Industry Facts section.—Ed.

### Continuous Casting

Sir:

Your annual issue of Jan. 1, pp. 298-9, reviews 1952 with respect to casting. On p. 299 is a box table listing continuous casting machines.

Any reference to the American Smelting & Refining Co.'s ASARCO process is conspicuous by its absence. This is unfortunate.

The following facts are pertinent in this situation: In your Aug. 26, 1948 issue you printed an article "Continuous Casting — the Asarco Process." In your Sept. 22, 1949 issue you carried a paper "Asarco Continuous Cast Shapes—Their Manufacture and Use."

J. L. KIMBERLEY  
Sales Manager  
Continuous Cast Products  
American Smelting & Refining Co.  
Barber, N. J.

It is certainly unfortunate and we apologize.—Ed.

### Better Heats

Sir:

Would you please send us tear sheets of "Stainless Steel Melting Practices Have Changed." This appeared in your Dec. 4 issue.

H. W. WHITNEY  
Chief Metallurgist  
Viking Pump Co.  
Cedar Falls, Iowa

THE IRON AGE



# Fatigue Cracks

by William M. Coffey

## Reminder

By this time it should be too late to spoil your Christmas, so here's a perm we received from one of these here tax lawyers.

Christmas again  
And I'm in a box  
No cards out yet  
And empty sex  
Don't believe in Santa Claus  
Think he's just a myth  
What kind of myth?  
Why Chrythmyth of Course.

It's pretty hard, by holly  
To phrase for you a greeting  
Jolly  
I could say: Have a full yule,  
a brand new year  
Or other thoughts equally dear  
But the dearest wish for which  
this heart yearns  
This tax man sends many happy  
returns.

Form 1040  
Mike Waris  
Washington, D. C.

There are exactly 51 days until March 15th.

## Crop Facts

Blacksmiths may now charge whatever the traffic will bear for shoeing a horse. If they wish to charge extra for tacking footwear on an especially cantankerous critter, that's all right, too. Price control was removed from this service on December 19th.

\*\*\*

The American Iron and Steel Institute reports that in making hairsprings for 300,000 watches, two pounds of alloy steel may be drawn into a wire 20 miles long. The wire in some of the steel springs for such use is one-fifth the diameter of an average human hair.

\*\*\*

Little Percy was on his first day at school, and his doting mother was giving the teacher a long list of instructions.

"He's such a sensitive child," she gushed. "When he's naughty you mustn't punish him. Just slap the boy next to him. That will frighten Percy."

(This joke was first introduced into Providence Plantations in 1642 by a wandering schoolmaster kicked out of the Plymouth colony for cheating.)

\*\*\*

General Services Administration is asking bids for supplying 3 station wagons to be shipped to the Far East through the Mutual Security Agency, specific destination unspecified. The GSA says it will

accept vehicles painted "any color except red."

## Snafued

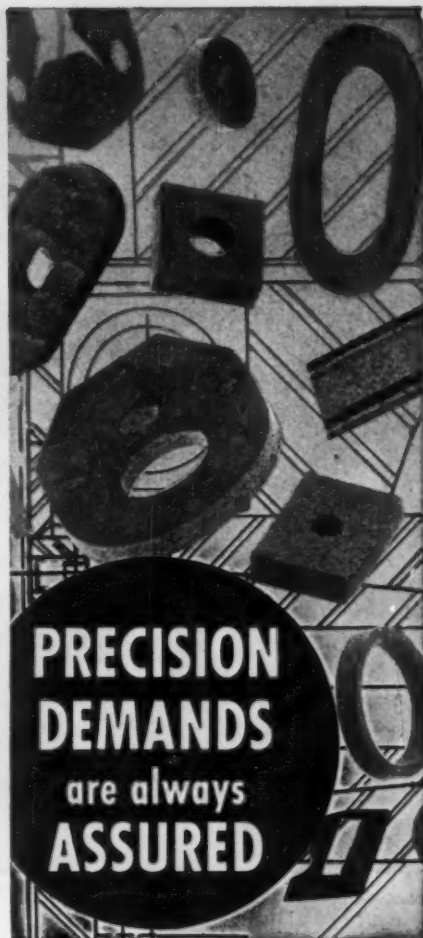
Everyone has heard of "bats in the belfry," no doubt. But reader L. William Fury of the Chamberlain Company of America, Detroit, sends us a new one, "moths in The Iron Age." Mr. Fury writes that on opening his December 18th issue he found a dead moth neatly squashed between pages 52 and 53. He says he's "gotten much information from the columns of Iron Age and no little enjoyment and 'education' from your column (very nice fellow, this Fury), but never, in all my reading have I come across a 'book-worm' in the butterfly stage." Some heads are going to roll around here, Mr. Fury. That moth should have gone in the Annual issue.

## Puzzlers

The correct answer to the check puzzle is \$28.57. Here are the winners so far: W. McCord, W. Burke, Jean Sykes, E. Knowlton, H. Roth, F. Rondepierre, J. McMurray, D. McCollum, A. Alles, F. Geyer, J. Voldrich, H. Bassett, A. Houston, A. Smith, Jr., B. Baer and E. Schwab, G. Nepon, D. Tarr, I. Chamberlain, B. Relyea (who also solved the monument puzzle), A. Tebbe (who also is right with the monument and unpainted sphere puzzles) and H. Roberts (who also solved the monument and unpainted sphere puzzles). E. Chimner submits the right answer to the unpainted sphere problem too. Some more winners on the monument puzzle: E. Schwab, Mary Lou Perrott, J. Prifogle, W. Sawdy, Mr. Fury, G. Bragg, Eugene Witherstay, George Weber, A. R. Kerr, Bruce Relyea, Charles King, J. Beardsley, Ed Donahue, W. Green, St. T. Yolton and E. F. Fernley. We've been swamped with this one.

## New Puzzle

Mr. Rice submits another good one: Beef dealers in a certain town used to sell 6,000 lbs of beef per week. After raising the price 5%, they find that they have lost by so doing 16% of their receipts. How many pounds did they sell at the advanced price?



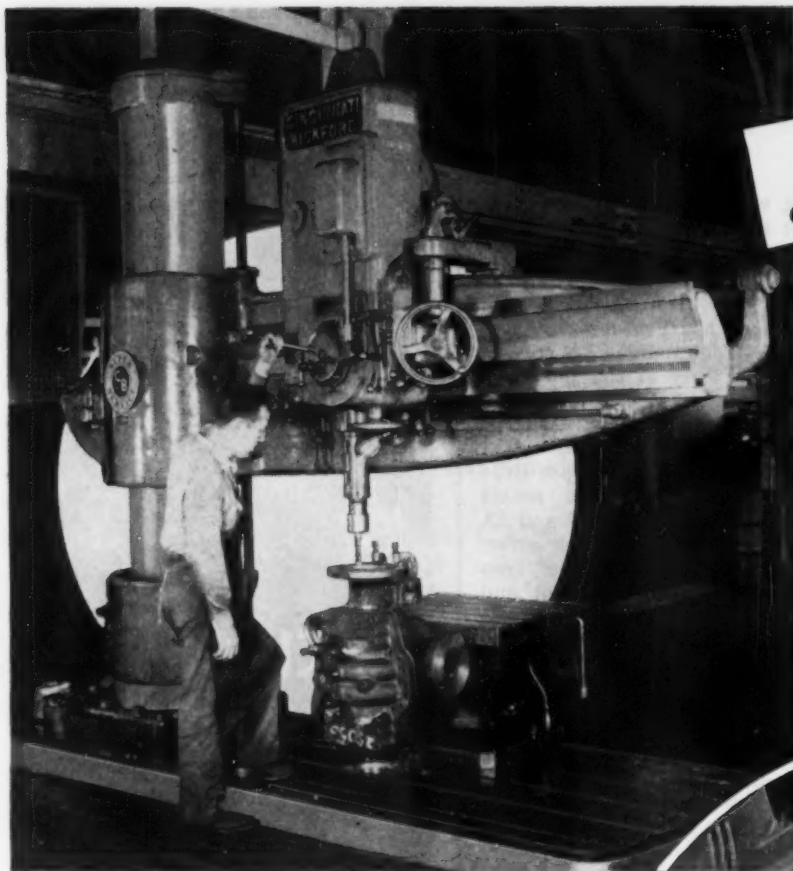
Technique of Western Felt production and processing has built an enviable reputation for engineering precision. Chemical specifications must be perfectly met—parts from wool softness to rock hardness are cut to close tolerances. As an extremely versatile material Western Felts are resilient, flexible, compressible. They resist oil, water, heat, age—do not ravel, fray or lose shape. New uses found daily. It pays to depend on Western Felt.

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- Excluding dirt, grit, dust • Retaining lubricants
- Thermostatic insulation • Isolating vibration
- Cushioning shock • Padding, packing, seals
- Air and liquid filters • Gaskets, channels, etc.
- Grinding, polishing, etc. • Weight reduction
- Instrument mounts

Sheet and Roll Felt Manufactured for Special Purposes and To Meet All S.A.E. and Military Specifications.





Photo—Courtesy Pacific Pump, Inc.

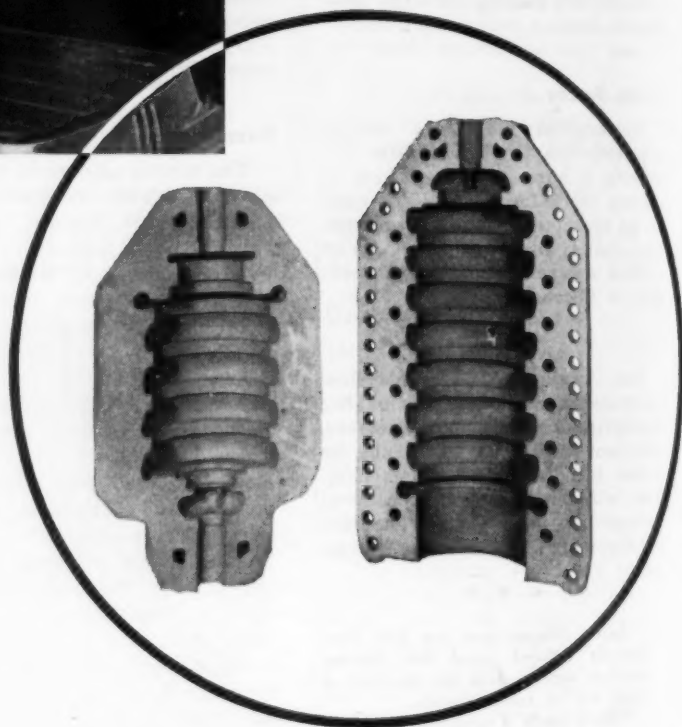
*faster and*

*easier...*

*machine  
performance*

Pacific Pump, Inc., say maximum production is the result of the faster, easier controls and fine balance of our 7' arm, 19" column Cincinnati Bickford Super Service Radial Drill. Here centrifugal pumps for process industries, utilities, and marine power plants, are being drilled, tapped, and spot-faced with speed and economy. Cincinnati Bickford Super Service Radial Drills will bring you too, maximum productivity at low cost.

Write for Booklet R-29.



Half shells for a centrifugal pump—approximately 100 holes are drilled—half of which are also tapped.

... **CINCINNATI  
BICKFORD**



RADIAL AND UPRIGHT DRILLING MACHINES

**THE CINCINNATI BICKFORD TOOL CO.**

Cincinnati 9, Ohio, U.S.A.

## THE IRON AGE Newsfront

**NO WONDER DEFENSE PRODUCTION IS SLOW.** Example: There are 8100 machining operations on the 937 parts required for the dual rotation turbo-propellers produced by Aero Products—Allison Div., GM.

**ON-THE-JOB TRAINING PROGRAMS IN AIRCRAFT PLANTS** are not providing enough skilled workers to meet industry requirements, the Labor Dept. claims. Less than 10 pct of 27,000 persons training in 143 plants are learning to be machinists, aircraft and engine mechanics, or jig and fixture builders.

**MACHINE TOOL BUILDERS PLUGGING** for governmental acceptance of emergency "shadow" plants, say it would take 6 to 8 months to activate such a program. Skeletal production facilities will replace stockpiling as a major element in defense preparation if the new administration okays the plan.

**NEW EMPHASIS ON SIMPLE, RELIABLE AIRPLANES** may result from the growing complexity of modern aircraft. Since World War II, the weight of aircraft has doubled. Average fuel consumption has increased five times.

**FOREIGN STEEL MARKETS ARE NERVOUS.** Netherlands and Italy, normally Belgium's best customers, are buying on a small scale. They may be hoping for lower prices when pool market operations start next April. Curtailed demand from other European countries and South America has small nations of the European Steel and Coal Community worried.

**PLASTIC IS BEING USED TO REPAIR BATTLE DAMAGE** on steel plates in some work being done by the U. S. Navy. Special plastic repair kits have been devised for the job.

**SUBSTANTIAL SAVINGS IN MACHINE HOURS** and increased tool life have been reported by users of fully-annealed gray iron castings. The casting producer, a pioneer in this field, indicates customer acceptance has been excellent.

**INDUSTRIAL FURNACE MANUFACTURERS** have launched a campaign to stress the essential nature of their products. Members of the Industrial Furnace Manufacturers Assn. are also emphasizing the close relationship between the machine tool and furnace industries.

**EXCESSIVE WEAR AND CORROSION IN AUTO ENGINES** are caused by racing the motor during the warmup period, according to a report by Chrysler investigators. Both wear and corrosion are excessive when engine temperature falls below 140° F, they say.

**CONTINUED STRONG DEMAND FOR PLATES**—well beyond mid-1953—is foreseen by some producers. They point to probable sustained outlets in production of transmission pipe, freight cars, storage tanks, machinery, warehouses. Backlogs of premium-priced mills are still heavy.

**A NEW HIGH-VACUUM MELTING FURNACE** recently installed by the Navy affords larger charges of purer alloys. The furnace can take a 200-lb charge of ferrous materials, melt them in a high vacuum. Metal is heated by a high-frequency coil from power supplied by a 50-kw, 3000-cycle motor generator.



# A.O. Smith Field- King

2½ KW Auxiliary  
Power



Construction jobs



Pipeline welding



Available in 200 and  
300 Amp. models

## The gas engine driven welder with the features YOU wanted!

**All-electric dual control** provides continuous, stepless current adjustment with constant engine speed!

**Electric idling control**, unlike other types which can easily clog or get out of order, assures perfect adjustment at all times and practically no maintenance!

**Auxiliary D. C. power** is a full 2½ kilowatts, the largest available in any standard engine-driven machine!

**A rugged machine** with less bulk! A field welder with 25% extra horse-

power that guarantees smoother, easier welding!

**Lighter weight!** The Field King 200-Amp. model, for example, weighs only 985 pounds. This is achieved by modern torsional mounting. This lighter weight means greater mobility and lower shipping costs.

**Greater fuel capacity!** The larger gas tank means a full nine-hour working day without stopping to refuel.

**A safer machine!** Extra baffle plates on

each side of the gas tank prevent accidental fires caused by unintentionally bumping the electrode against the gas tank.

**It's the field welder** you've been asking for . . . now available with the A. O. Smith name, guarantee and reputation behind it.

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Welding Products Division  
Dept. 1A-153, Milwaukee 1, Wis., U.S.A.

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# PLATE: Demand Will Crowd Third Quarter

**Current consumer push for light and heavy plate may force hot demand into third quarter . . . Premium-priced plate finds buyers . . . Why demand may continue solid—By J. B. Delaney.**

The steel plate producer who says his market is good through the first half of 1953 is being modest—for he has left unsaid that the market will probably continue solid into the third quarter.

Today's high-pressure demand for both light and heavy plate is rolling in from virtually every possible source.

One signpost to extent of this overwhelming demand is a premium-priced producer's reporting that he is booked solid through the first quarter and is almost loaded through the second. Consumers would be even willing to commit themselves for the third quarter if he would but open his books that far ahead, he indicates. Remember, this is premium-priced steel that consumers are eager to commit themselves on.

**Who Wants Plate**—Not counting the military, which can take 25 pct of output, demand is coming from five principal sources: Producers of pipe for oil and gas transmission lines, freight cars, storage tanks, and from structural fabricators and warehouses.

This does not include plates for shipbuilding nor machinery builders. A considerable tonnage of plates will go into construction of heavy presses for the Air Force.

One large producer foresees continued strong demand for plates well beyond mid-1953 when steel orders generally are expected to show signs of falling off from the present peak.

**Plate for Line Pipe**—This optimism is based largely on the patent demand for oil and gas transmission lines. An educated guess

is that plate for this purpose might be in as strong demand for three more years. If true, this would be enough to offset weakness from any of the other major market outlets.

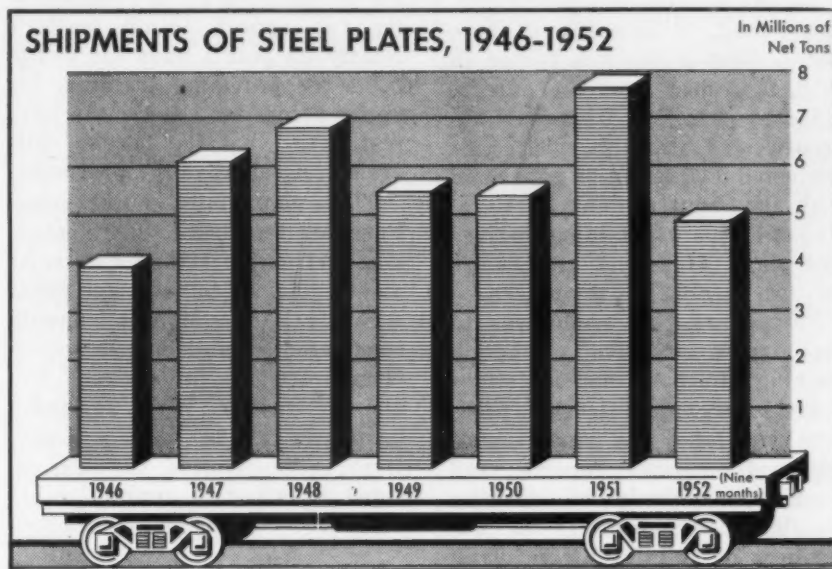
Natural gas pipelines being pushed into new areas of the coun-

production attains the goal of 10,000 cars per month the carbuilders will need plates into third quarter.

**Would Double Stocks** — Warehouses look for a good plate market through the first 6 months of the year. One warehouse indicated it would double its inventory of plates if they were available.

Farms using propane gas for cooking, heating, and other purposes also provide a good long-

SHIPMENTS OF STEEL PLATES, 1946-1952



try, particularly along the Eastern seaboard, first take up a goodly share of plate and then create a supplementary plate market in the need for storage facilities. Except in areas where depleted gas fields serve as storage places, tanks must be built.

The freight car program will assure continued demand from this source through at least the second quarter. The program is back on the track following a slump caused by the steel strike, and carbuilders now are producing more than 8500 cars per month. Backlog of cars on order as of Jan. 1 totaled 80,296. Even if

range outlet for plates. Pressure tanks are used to store this gas at the farm.

The market at the moment is soft because of a temporary shortage of central storage capacity limiting the number of farm consumers who can be serviced. This shortage is being slowly overcome.

**Defense Too High**—One complaint heard in the trade is that the 25 pct set-aside for defense is overly high. Depending on where they are located, some mills are forced to accept defense business to the limit of the set-aside, while other producers find their defense

## APPRENTICES: Survey Shows Need

**Apprenticeship Bureau study finds need for more aircraft trainees . . . Hot war would bring acute shortage of skilled workers . . . Industry expands programs—By R. M. Stroupe.**

Not enough apprentices are being trained to bolster the labor force in the aircraft and parts industry, which may need as many as 875,000 general and skilled workers by first quarter 1954.

Tool and die makers, aircraft and engine mechanics, jig and fixture builders, and machinists are especially scarce. Moreover, their scarcity would be much more acute if the U. S. were suddenly rushed into full mobilization.

Bureau of Apprenticeship, U. S. Labor Dept., is the source of these views. Over a 6-month period in 1952, field men from the bureau, aided by personnel from state apprenticeship agencies, visited or contacted 143 facilities connected with the industry. This total included 97 plants building engines and parts, 44 assembling planes, and two turning out propellers.

Purpose of this study was to urge more effective on-the-job training. Bureau representatives talked over apprenticeship problems with labor and management, reviewed progress reports, and discussed methods of meeting training needs peculiar to the business of building aircraft and engines.

**Production Innovations**—One of these special requirements concerns adaptability of the individual employee. Growing use of jet engines and installation of vari-

ous devices designed to improve plane performance have produced innovations in production processes. Thus, while training of employees in quantity is necessary, it is also desirable for a worker to learn a multiple number of skills.

Results of the bureau study point to a stepped-up training program throughout the aircraft industry. In almost three-fourths of the facilities contacted a company official has been given responsibility for apprenticeship matters. Nearly all plants have the equipment for providing training, the study points out, and most have instituted what the bureau calls "relatively short-term" programs.

These abbreviated courses sometimes are replaced by more extensive instruction arrangements. As an example, the bureau says, Solar Aircraft Co., Des Moines, formerly considered establishing a short-term procedure for training tool and die makers. While reviewing manpower needs with a Labor Dept. representative, the firm decided a full-scale apprenticeship program would be more suitable.

**Follows Experience** — Even before some of the new engine plants were ready for operation, parent companies had their apprenticeship apparatus in shape. One such organization was Ford Motor Co., which based the plan for its Chi-



**BASIC:** Republic Aircraft jig maker trainees start with basic shop practices at Port Washington, N. Y., high school.

cago facility on the experience gained in other Ford plants.

By last June 30, the new plant reportedly had some 150 apprentices learning to be diesinkers, die-makers, metal and wood pattern-makers, and industrial machinists and electricians.

Bureau personnel are credited with aiding Oldsmobile Div. of General Motors in outlining a program for instructing competent jet-engine builders. Result was a rounded training plan, providing for apprenticeship and related programs for "all occupations in the various production departments."

**Increase Programs** — Besides backing the formation of apprenticeship classes, field agents recommended that a greater number of persons be enrolled in training programs already established. Small producers of engines and parts, the bureau said, are not able to list many trainees among their employees. The 12 smallest plants contacted in this field reported only 86 apprentice workers collectively, while the two largest had a combined total of over 300.

## Special Report

*Continued*

tonnage is only partially taken up. Also, very little, if any, of the defense business is placed with the premium-price producers. The military has the advantage of being able to book the lower-price producers.

The picture on structurals is much similar to plates and de-

mand is expected to hold up through second quarter. Prospects for sustained requirements for road construction, plant modernizations, machinery builders, railroads, and warehouses is excellent.

Direct defense orders have dropped off.



## LABOR: Republic Trains Jig Makers

Republic Aircraft uses facilities of two Long Island high schools to train jig makers . . . Saves production space, time  
Trainees use company, prints, tools—By W. B. Olson.

Industry-community cooperation is getting an unusual twist in a remarkably successful job training program for Republic Aircraft Corp. on Long Island.

Faced with a shortage of aircraft jig builders in the New York area, Republic borrowed high school shop facilities from the towns of Port Washington and Freeport, N. Y. About 150 jig builders have been turned out in the past year. Plans call for training 300 more young men.

Republic, growing fast to keep step with defense needs, can use every square foot of shop space for production. An important advantage of its out-of-plant training program is full attention to trainees without hindering production routine. Instructors are not pressured to release students to manufacturing divisions prematurely.

Trainees are all high school graduates with some mechanical background. Many were garage mechanics. All prospects for the course take standard mechanical aptitude and arithmetic tests.

Four classes of 20 men each, meet in shops and classrooms of the two high schools from 2:30 to 11 p.m. There's a half-hour dinner period, two smoke breaks for relaxation.

**Basic Work First**—Courses include geometry, trigonometry, blueprint reading. A course in sketching gives better understanding of aircraft blueprints and flat pattern layout. Total training time is 600 hr.

Teams of two trainees start by making simple templates, working from regular Republic prints. Training includes cutting and precision filing, how to calculate bend allowances and springback, making checking and hand tools. Advanced work is introduced after basic shop practices have been mastered.

Entire program—parts, tool, fixtures—is integrated to give trainees a better appreciation of coordination needed between tools used in making and assembling parts.

First big step is to make a combination pattern template for a leading edge. Next comes a complete form block from which parts are rubber formed. Third step is a detail drill jig. Finally, a rib is installed on an assembly fixture with a Y level and layout. The big assembly fixture itself is a class project. Parts, and the tools to make them, must pass rigid Republic inspection.

Republic makes the pay setup attractive. Trainees get \$1.25 an

### From 5200 to 22,000 Workers

Republic Aviation has 22,000 persons on its payroll, a tremendous step forward from the 5200 employed in Aug. 1950. According to Charles J. Ketson, employment manager, Republic has met all employment needs through hiring, training and systematic upgrading within the plant. Since that date Republic has interviewed 119,000 people, hired 27,900. They also credit the Casey Jones School of the Academy of Aeronautics. People trained at Casey Jones were hired first by Republic and trained at the school at Republic's expense. More than 6300 riveters, assemblers and other aircraft technicians have received their training this way.

hour while learning. When they finish the course, they move into jobs with the company at \$1.63 an hour. Atop this are 38.8¢ in non-mandatory fringe benefits, including a 2-week vacation, eight holidays, and 5 days of sick leave. While in training, students have hospital and medical care for themselves and their families.

**Real Orders**—In the final weeks of the course, the men begin to get regular tool orders from the plant. By the time they move into production at the shops, they thoroughly understand every step in Republic's tool production setup.

Washouts average four per class. Some quit, others lack ability, and some are temperamentally unsuited to the work. When trainees have completed their courses, Republic knows pretty well in advance how the men will work out in the shop. This heads off trouble by eliminating men who might later have to be dropped.

Republic pays the schools \$7.50 per instructor hour for each group of 20 men. Thoroughly qualified Republic shopmen are in charge of each class. Additional instruction is provided by regular high school instructors.



VARIED: Multiple skills are practiced by Republic Aircraft student jig makers at Freeport, N. Y., high school in program using local community facilities.

## GRAY IRON: Founders Warily Optimistic

**Is recent rise in business beginning of market upturn? . . . Small castings had slipped badly, have much ground to recover . . . Raw material buying cautious—By K. W. Bennett.**

Gray iron foundrymen were peering over the parapet again last week. Preliminary returns for last quarter '52 and beginning '53 indicated there might be some badly needed fresh business in the air. After the drubbing they had taken in mid-'52 (gray iron shipments fell from 1,199,285 tons in January '52 to 636,141 in July), they were regarding the upturn with understandable caution.

But a few were jumping in. A large midwestern foundry boosted its coke supply by 100 pct for this January. The firm, rather hopefully, acknowledged that volume had begun an upturn in November December was an improvement over November. The first week in January was better. The second week in January was better than the first. Volume orders committed to July of '53 had been upped in tonnage on small "miscellaneous" castings.

**Ground to Gain**—Small gray iron castings have needed help, must recover much lost ground. In a 12 million-ton year (estimate for 1952), miscellaneous gray iron accounted for only 26.6 pct of total gray iron casting shipments at the end of third quarter. Available statistics cover ingot molds, railroad wheels, pressure pipe, and miscellaneous castings.

In 1949, a 10.5 million-ton year, miscellaneous gray iron castings constituted about 62.7 pct of total shipments. In 1950, while the total market went to 12,906,562 tons shipped, miscellaneous casting shipments rose to only 62.9 pct of the total. In 1951 the percentage slipped disastrously. While production of specialty items brought shipment totals to 15,038,751 tons, miscellaneous castings dropped to approximately 29.7 pct.

In the first 9 months of 1952, all gray iron shipments through

September totalled about 9,424,282 tons with miscellaneous castings rising slightly to 30.0 pct.

**Cautious Buying**—Foundry purchasing agents are playing their cards close to the chest. Firms that once purchased raw materials for a full quarter to fill long range orders now buy no more than 30

**Slow Rise**—The upturn is not yet widespread. Small foundries in several instances hit a plateau in late October, with a business level 20 to 30 pct below January '52, and have been stuck there. Even in such cases there is a note of sturdy optimism.

Reports one: Purchases of small castings were leading buyers' inventories in the first quarter of last year, carrying this into second quarter in some instances. When business levels sank at mid-year, consumption of these over-large inventories was slow. Now, after better third and fourth quarters,

### Gray Iron Casting Shipments

Products	1949	1950	1951	1952*
Ingot Molds	1,776,242	2,303,661	1,250,532	732,552
RR Car Wheels	555,569	514,074	568,272	393,762
Pressure Pipe & Fittings	1,029,743	1,203,762	1,464,921	911,035
Soil Pipe & Fittings	533,310	761,317	688,180	488,553
Misc.	6,624,420	8,117,748	4,468,862	2,833,074
<b>Totals by year</b>	<b>10,549,284</b>	<b>12,905,562</b>	<b>15,038,751</b>	<b>9,424,282</b>

\*First 9 months of 1952 only. Total estimate for year is 12,000,000 tons.

days' supply. This ups paper work but shows foundrymen's distrust of the market.

Despite this a foundry coke supplier reports an appreciable upturn in sales to general foundries over December. Coke had been dragging. In some quarters coke sales had been tied to pig iron sales, pig being in lower supply. Foundry coke is not a strong inventory item. It is generally bought for use in the near future.

Again from the supply end, pig iron had been coming into considerably better supply. Most grades were not hard for an old-line purchasing man to find. Charcoal iron was tighter in some areas, but even this is obtainable. An established foundry, buying in latter December, has been cut from 200 to 150 tons by allocation. The purchasing agent indicated he has business that could use more iron. But his allocation, previously 80 pct, had been cut to 75 pct. His purchase was based on a business level comparable with January 1952.

consumers will again be obliged to rebuild dwindling inventory levels. To verify this thinking, there has been some resurgence of buying, particularly in industrial equipment.

An important area of the gray iron field, soil and pressure pipe, is waiting opening of the building season. Inventories are low, buying cautious.

Large gray iron castings (over 1 ton) remain fair to good. Medium castings of 500 lb to 1 ton have been moving into a better position despite slowdowns in machine tool and farm equipment activity. Small castings were looking a little better. Foundrymen point out that the slight upturn is not based primarily on the old appliance-farm equipment-automotive trinity. Machinery and industrial equipment have been taking up some slack.

Small castings and miscellaneous castings generally have much lost ground to recover. But there was a tinge of hope last week.

## AD-X2: Will It Prolong Battery Life?

National Bureau of Standards says "No" . . . But Senate Small Business Committee says Massachusetts Institute of Technology contradicts . . . Controversy grows—By W. V. Packard.

Officials at the National Bureau of Standards probably wish they had never heard of AD-X2, a controversial white powder for batteries.

The makers of the battery additive claim (with considerable scientific backing) that it can prolong battery life and help restore dead cells, still mechanically sound. But NBS claims (with equal amount of scientific backing) that it is "worthless."

**Same Category**—When the venerable bureau tested the white powder 4 years ago it seemed like other tests of dubious products, including battery additives, which it had been conducting as a public service for nearly half a century. (More than 100 battery additives had been scrutinized by the Bureau in the previous 30 years). At least the results were the same; AD-X2 was placed in the same category with other "worthless" additives.

Now NBS is bearing the brunt of embarrassing criticism leveled at it from a number of sources. Criticism results from intercession of the Senate Small Business Committee and publication of exhaustive tests by Massachusetts Institute of Technology — which are in sharp contrast with test results previously reported in NBS circulars.

But the sharpest barb for NBS officials is comment on the MIT report by a California chemistry professor, acting as consultant to the Senate Committee.

**Never Say Die** — None of this would have happened if small business man and inventor Jess M. Ritchie had been willing to admit he was licked when NBS, after additional tests, refused to deviate from its position that the pow-

der was worthless. But the youthful president of Pioneers, Inc., Oakland, Calif., (marketing company for the powder) still had deep-rooted faith that it was beneficial to acid-lead storage batteries, if properly used.



**Huddle:** Jess M. Ritchie, president, Pioneers, Inc., (right) discusses letters inquiring about AD-X2 with I. A. Calpestri, comptroller (left) and W. M. Hager, executive vice-president.

He was encouraged by other tests which indicated his product did prolong battery life. Favorable results were reported from tests by U. S. Testing Co., Sacramento Air Materiel Command, University of San Francisco, and others.

**Customers Help** — Despite the fact that business shrank under the glare of NBS, and subsequent condemnation by the National Better Business Bureau, Mr. Ritchie was able to sell enough AD-X2 to accumulate favorable information on how the powder fared in actual commercial use.

The data were collected in the form of testimonial letters from

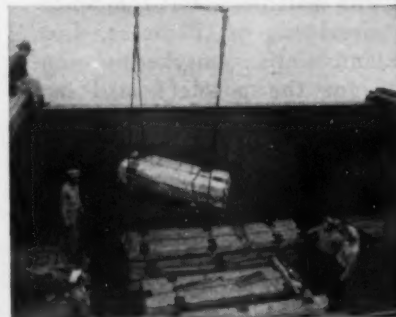
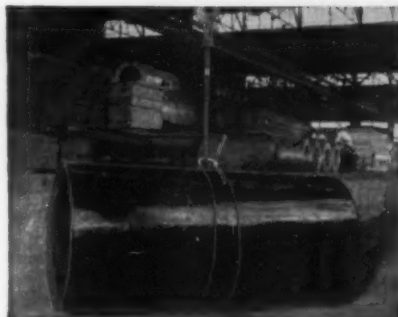
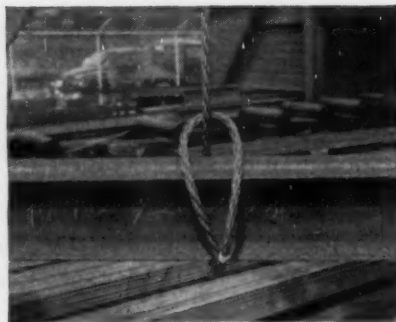
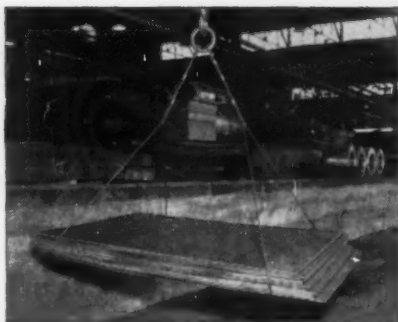
scores of satisfied users. This reporter has seen a number of these letters from responsible officials of companies and municipalities using the product. Validity of the letters was checked by the Senate Small Business Committee under direction of its chairman, Sen. John Sparkman, D., Ala.

The committee's attention was focused on Pioneers' fight for survival by Senators Nixon and Knowland of California. The MIT tests were conducted at the request of the committee.

**Encouraging Report**—In summarizing the lengthy MIT report for the committee, Dr. Keith J. Laidler, associate professor of chemistry at Catholic University, says the tests show that AD-X2 will:

- (1) Reduce harmful effects of sulfation and extend life expectancy of mechanically sound lead storage batteries.
- (2) Encourage redeposition of shed materials.
- (3) Decrease loss of water.
- (4) Increase speed of charging, and normally increase capacity of mechanically sound sulfated batteries.
- (5) Protect stored batteries con-



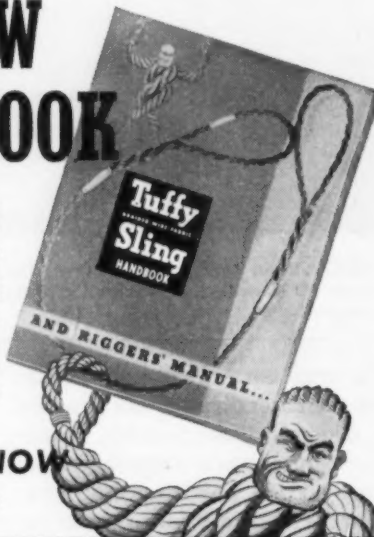


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- 1 How to determine the sling types you need
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- 4 Proved ways to cut sling costs
- 5 How to splice wire rope — directions for socketing

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### Research

taining acid for longer periods against destruction by sulfation.

**Sticking to Guns**—Although admittedly "taking quite a beating", NBS is sticking by its guns. NBS Director A. V. Astin, invited to comment by THE IRON AGE, had this to say:

"NBS has confidence in its findings and is aware of no scientific basis for questioning its conclusions. If scientific data are ever discovered establishing value for such materials, NBS will not hesitate to amend its position. . . . The Bureau is studying the MIT report and will issue findings when work is completed."

### Manufacturing

#### SHELL MOLDING:

Production of phenolic resins will be 17 times that of 1952 total.

Growth of the shell mold process in American foundries will be accompanied by an upswing in the production of phenolic resins. This will continue through and beyond 1957, predicted Robert K. Mueller, Monsanto Chemical Co.'s Plastic Div. general manager.

He estimated production volume of phenolic resins would eventually be nearly 17 times the 1952 figure. Shell mold process resins have more than doubled each year since 1950. They now are made at a rate of several million pounds annually.

**Order Backlog**—Mr. Mueller said the percentage of foundries having installed shell molding machines may still be small but success of the process can be clearly gaged from the backlog of orders for equipment.

He reported that very few shell molding machines were operating in 1951 but 20 foundries were in actual production in 1952 and more than 100 were past the development stage.

Another measurement of expansion in '52 is the number of molding stations in operation. Last year about 300 stations were making shells for castings and by the end of '53 this number should triple.

## FURNACE BUILDERS: Chart New Course

**Furnace builders seek closer relationship with tool builders . . . Say 500 surplus furnaces are rotting away . . . Would like inclusion in shadow plant program—By R. M. Lorz.**

Members of the Industrial Furnace Manufacturers' Assn. are looking forward to 1953 as a year filled with hope and challenges. They feel the association is entering an era in which industrial heating devices will gain wider recognition as a vital part of the defense program.

In their effort to firmly emphasize the essentiality of industrial furnaces, association members hope to establish an even closer relationship with the machine tool industry. Program will be implemented by new association management policies aimed at reducing bottlenecks and obtaining close cooperation with the new Administration.

**Un-Retired** — Veteran furnace maker Carl Ibsen, who was called out of retirement to manage the association, says recognition of the industry should be followed by more defense dollars and a greater share of government support for expansion.

If expansion facilities are underwritten by the government, the furnace making industry can become an integral part of the proposed pilot plant program which is being boomed by the machine tool builders. Furnace makers are especially interested in "shadow" plants because of growing dissatisfaction with present handling of surplus furnace units.

**Furnaces Rotting Away**—Members of the recently disbanded advisory committee say there are at least 500 furnace units rotting away in outside storage depots throughout the nation at the present time. They feel there is a definite need for a centralized agency which could tie the loose ends together and bring an end to wasteful storage practices.

Former advisory committee mem-

bers hope such an agency will be set up soon to inspect, salvage and scrap furnace units. An industry-government team has also been proposed to eliminate lack of direction in the storage program.

The coordinated program would also have real value in connection with reclamation of nickel-chrome

components which have been extremely scarce for a long time.

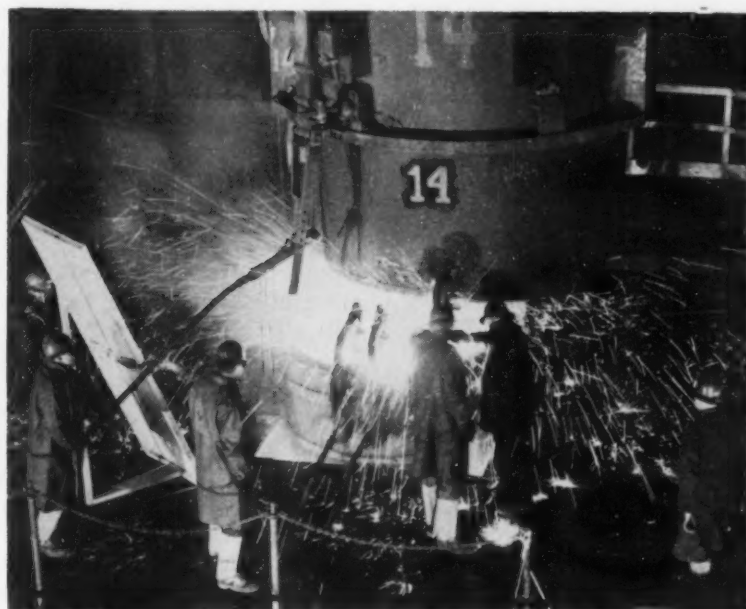
**Changes Suggested** — Although leaders in the industry don't expect to have any real trouble with nickel supplies, allotments or allocations will probably be in effect throughout the year. Most furnace makers currently are in favor of a system of direct allocations which would permit shipments of nickel to foundry suppliers. Under present CMP system nickel has to be re-routed to foundries and resulting delay has held up castings deliveries in many instances.

## Jumbo Ingot Poured for Press

Bethlehem Steel Co. poured steel for the first column of the largest press yet ordered in the Air Force heavy press program at its Bethlehem, Pa., plant last week. In a departure from conventional one-piece cylindrical column design, columns for the 50,000-ton press will be fabricated of three rectangular forgings up to 110 ft long.

To cast steel for the column forgings a new ingot mold 18 ft high by 9 ft in diam was used. Heats from two openhearth were poured in sequence to form the 275-ton ingot. Bethlehem plans to use a 7500-ton press to forge the giant ingots into columns approximately 110 ft long by 16 in. thick. Maximum width will be 100 in.

When assembled, the six-column, 50,000-ton press will stand 10 stories high. A 100-ft deep foundation has been constructed at North Grafton, Mass., where the press will be constructed by Loewy Construction Co., New York. It will be used by the Wyman-Gordon Co. Concrete supporting walls for the press are 13 ft thick.



## AUTOS: Selling Cars With Fanfare

**It may never get the Critics' Award but GM's extravaganza is worthwhile seeing . . . Besides the orchestra, chorus and dancers there are 38 snappy cars to see—By R. D. Raddant.**

General Motors' newest extravaganza, "Motorama of 1953" is the nearest possible thing to a circus without actually going under canvas.

It has the fanfare, the advance men, the noise, music, pretty girls and even, in a most subtle way, the hucksters. The difference is that these hucksters aren't selling

throughout the country. About 80 pct of the original show will go on the road.

It includes 38 automobiles altogether, seven of them new special customized automobiles. Four of these special jobs are of plastic construction. Thirty-six Frigidaire products are on display. Other exhibits take the visitor



PLASTIC BODY: What future Cadillac may look like. This is the LeMans.

peanuts and popcorn. They are selling those beautiful new cars.

Of course no visitor to Motorama will be buttonholed by an eager salesman either in its run this week at the Waldorf-Astoria in New York or later in any of the road shows. But underneath the fanfare, that is its very purpose—to move those cars onto the market.

**No Secret** — This was stated frankly at the press preview of the show by Harlow H. Curtice, acting president of GM. These shows, he said, have played a major part in the growth of the industry.

But setting aside its practical purpose, Motorama is quite a show. About 500,000 people will see it in New York, millions will view it on television, and other thousands will see it in Miami, Chicago, and other points

into the research laboratories, into styling sections and into engineering laboratories.

**Gay Variety** — Entertainment includes a 24-piece orchestra, choral singing ballet and a fashion show in which models parade the latest trend in women's clothes. (Or is this getting a little away from metal working?)

This entertainment is on a two-level mechanized stage in the Grand Ballroom where GM's five automotive divisions have their cars gliding on and off the stage in order, each turning completely around in transit for full inspection.

Besides the ballroom, each division has its own exhibit room where 1953 models are shown in dramatic settings. The big feature of each divisional exhibit will be its own special car. Although they vary in size and styling, each

is a low-slung model with futuristic lines. Their names alone gave advertising copywriters an open field.

Cadillac and Pontiac went continental, Cadillac calling its two specials the LeMans and Orleans, and Pontiac coming up with the La Parisienne. Chevrolet has the Corvette, Buick the Wildcat and Oldsmobile the Starfire.

**For Instance**—Taking LaParisienne as an example this is what one of them looks like: Its color is not black, it's "black-black." Its headlamps are French visored and the windshield is raked at the same angle as the radiator. It is carpeted in black broadtail and seats for the chauffeur and footman are done in pink cowhide. Pink leather lines the domed room. It has a 7-in. road clearance and stands 56 in. high.

There is no way to estimate the show's cost, either in hard cash or time and effort, but GM obviously considers it a good investment. In the past 2 years GM was forced to give up the show because of defense requirements, but it did so reluctantly and rescheduled the event this year with zest.

In opening the show, Mr. Curtice took time to discuss business.

**Outlook** — GM is still in the process of developing techniques in plastic body design. The divisions may make several hundred this year, but have no thought of plastics replacing steel to any real extent.

The 1953 market should approach 1951 levels when GM alone produced about 3 million cars. GM hopes to regain its pre-Korea share of the market which reached 47 pct. The figure is now slightly lower.

GM has good relations with the UAW and Mr. Curtice expects the company "to continue negotiating privately and maintaining a quiet labor front."

First quarter car production for GM is about 40 pct higher than 1952 and should reach 900,000 cars in U. S. and Canada.



# STEEL: Reroller Makes Its Own

**Huntington, W. Va. firm starts producing steel with new electric furnace . . . Has market protection from freight umbrella . . . Scrap supply in fine shape—By W. V. Packard.**

You don't have to be an old timer to remember when local sportsmen hunted rabbits within four blocks of the Frederick Hotel in Huntington, W. Va. They used to pause there for mid-hunt lunch.

But anyone who left there then wouldn't recognize that Ohio River town today. It has blossomed into a bustling city of more than 86,000 persons; nearly 200,000 are numbered in the metropolitan area. And industrial employment of over 25,000 yields a payroll of better than \$67 million.

**Making Own Steel**—Last week the citizens of Huntington proudly celebrated the entry of West Virginia Steel & Mfg. Co. into the field of basic steel production. The firm had been producing limited steel products from rerolling rails since its formation in 1907, but addition of an electric furnace marks a new beginning for it as a producer of raw steel.

The people of Huntington were justly proud because, after nearly half a century of service, West Virginia Steel had become a symbol of community progress.

**Advantages**—In addition to its location in a thriving industrial community on a great river, there are other factors favoring the future of the company: (1) There are no other steel producers nearby. (2) Good quality scrap is abundant in the area. (3) The mill can produce and sell under protection of a natural freight umbrella resulting from the f.o.b. method of selling now used by the steel industry.

Still active, D. C. Schonthal, father of West Virginia Steel, vividly recalls the early days of the small town steel company. In the beginning the rerolling company produced only a few sizes of light rails for nearby coal mines.

The product range was gradually broadened to include mine ties, frogs, and switches. Finally, light structurals and reinforcing bars and fence posts were added.

**Conversion Hits**—All these products were made by rerolling rails. This is still a thriving business, carried on in a building separate from the steelmaking division. There you can still see workmen expertly whipping hot steel bars in and out of the rolls like long strips of taffy.

During World War II the company, like others in the steel industry, could not satisfy all the demands for its products. Rerolling rails were hard to get in quantities needed, so the company started buying billets whenever it found them available.

In some cases customers furnished their own billets for rolling into urgently needed finished steel shapes. Thus did the conversion deal invade this far-flung finger of the steel industry.

**Plenty of Spirit**—According to John Durkin, executive vice-president, the next step was "a natural." A \$2 million plus loan from

Reconstruction Finance Corp. was used to help buy equipment necessary to start ingot production.

Mr. Durkin, by the way, finds relaxation from running the expanding firm in sports. He is a well known football referee, greatly in demand throughout the Southeast. He has won both respect and affection from employees. And he is surrounded by a staff among whom a fine spirit of teamwork is evident—even though individualism and self-reliance is encouraged.

**Like Equipment**—The furnace is a 30-ton Lectromelt from which they tap 40-ton heats. It is a top-charge unit that is tilted for tapping, and officials are enthusiastic about its performance so far. Regular carbon steel heats average about 4 hr; heats of forging quality steel take about an hour longer.

The four soaking pits will handle output of an additional furnace, for which space has been reserved. A reconditioned blooming mill breaks down the 17½ x 18½ x 64-in. ingots.

Other equipment that has been added to serve the new furnace includes a hot shear, new push on and runout tables and conveyers.

The company has a healthy backlog of orders on hand and a scrap pile that would keep a much larger firm operating for a good many days.



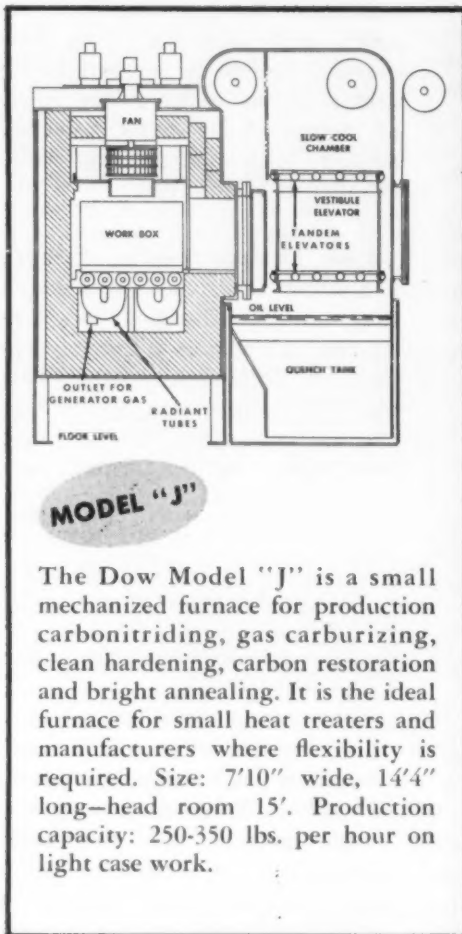
**VIDEO TO SCHOOLS:** So that students of public and parochial schools could view the Presidential Inauguration, W. H. Worrlow, president of Lebanon Steel Foundry (in black hat, center) presented them with television sets. This is the first of 16 sets going to the Lebanon, Pa., school system.

# DOW

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**MODEL "J"**

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### Financial

## CONGRESS: Forgets

**Plea for continuation of New Deal program gets cold shoulder on Capitol Hill.**

Congress may be expected to read, file away, and then forget Ex-President Truman's final economic message which was sent to Capitol Hill last week.

Main reason is that both the message and the report by Mr. Truman's Council of Economic Advisers in general called for a continuation of the Truman program. This meant more high spending, high taxation, and continuation of production, wage, and price controls.

Otherwise, warned the departing President, the outlook would be for about 1 more year of continued prosperous times and then business and industry could hit the skids.

**How He Thinks**—The Truman-CEA reasoning runs this way: It is estimated that there will be a slacking off of about \$10 billion a year in defense expenditures after this year. This would have to be offset by consumer and other non-military buying.

A majority of the council frankly doubted that new consumer markets would appear fast enough to do the trick without a little pump-priming by the government and a shoulder to the wheel by private enterprise.

Part of Operation Shoulder, said Mr. Truman, should consist of business "progressively" boosting wages and at the same time "systematically" cutting prices.

Private enterprise could well afford to take less profits now in order to make more profits later, he said. It is believed to be as simple as that.

**No Tax Cuts**—Another familiar note was injected into the economic message — warning that it would be a mistake to cut taxes now. It is argued that tax reductions should be held back for a

# Truman Message

year or so until they are needed for pump-priming against recessions.

If these major policies of the out-going Administration are followed, it was indicated, all would be sweetness and light. There would be no reason why the national gross product would not increase from the present rate of \$345 billion annually to \$350 billion next year and to \$375 to \$400 billion within a decade.

Most of the report was based on the assumption that the new Congress would accept the Truman-proposed \$79 billion budget. It is admitted that this would result in another \$10 billion deficit or more. This spending program, said Mr. Truman, would support a "fully employed economy" over the next couple of years.

**Warns on Future**—Blunt warning is issued to the effect that "if trouble develops" over the next few years, the new Administration can take the direct blame if it forsakes present policies. Their continuation, on the other hand, would bring "early reversal" of any recession trends.

But even Democratic members of Congress candidly feel that the voters last year repudiated the New Deal and Truman programs, particularly as they apply to attitudes toward industry, toward government controls, toward taxation.

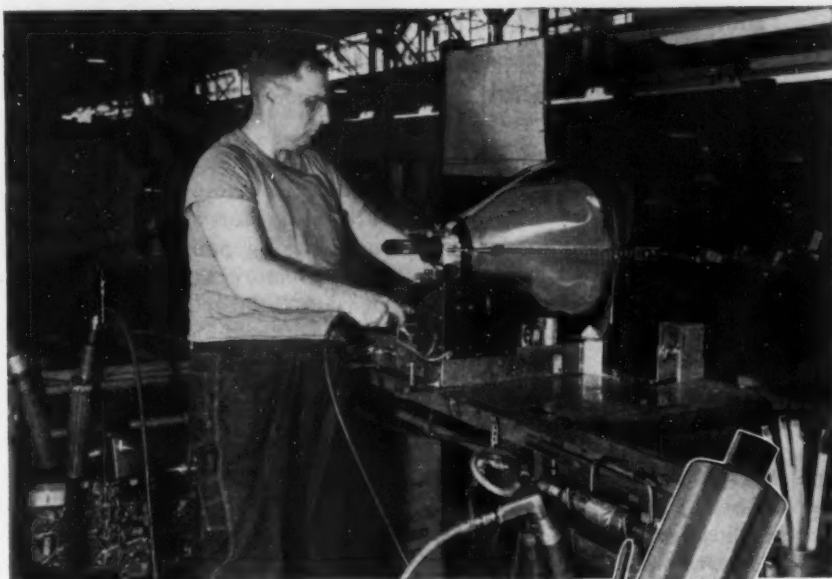
Congress wants to look at proposals from President Eisenhower. It also has some ideas of its own.

One is that the budget can be cut by \$10 billion. Another is that no price and wage controls are necessary for peacetime and that control over materials should be limited to simple defense priorities.

Still a third belief is that some tax reductions must be made now. Part of this is due to honest sentiment that taxes are too high, part is due to a desire to redeem campaign pledges.

## KELLER Air Tools

### Speed TV Assembly



ANOTHER EXAMPLE OF  
*KELLER Air Tools engineered to industry*

Keller Screw Drivers and Nut Setters, conveniently mounted in "scabbards" along the edge of the workbench, have reduced the cost of assembling these TV sets 50% or more.

#### FACTS IN BRIEF

ABOUT KELLER PNEUMATIC SCREW DRIVERS

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## STEEL POOL: How Deep Are Cracks?

**Difficulty of establishing coal-steel pool more evident as deadline nears . . . Pricing, financing, trade problems can be solved by cooperation . . . Plan is needed more than ever.**

With the Schuman Plan steel pool scheduled to go into effect in 2½ weeks, member nations find themselves in the not unexpected position of two men who want to play cards but find that one is strictly for pinochle while the other wants acey-deucey.

If they want to play, they'll have to learn each other's game.

In recent months it has become increasingly important for the well-being of the free world that the European Coal-Steel Community function effectively. With seams popping on the European military alliance program, the welding of economic interests may save the day for unification of Europe. Military alliances have always been transitory, but an economic link between nations would provide a much stronger bond.

**New Market**—The steel pool is also the key to a major improvement of Europe's steel industry. Previously, nationalism of the individual countries restricted the market. Under the pool plan a market of 155 million consumers would be opened up as a whole.

Main problem facing the six steel pool nations is getting the shiny, new Schuman machinery in motion. Feb. 10 is the date for establishment of a common market for coal, coke, scrap and iron ore. Following this merger, a common market is to be set up for pig iron, steel and finished products, beginning on Apr. 10.

**No Barriers**—To create a single market it is necessary to break down import duties and export quotas. Critics of the program point out that none of the six pool nations has yet issued the regulations needed to level these barriers.

These same critics anticipate

snagging of the steel pool program on the pricing problem. With coal selling for \$9.85 per metric ton at basing points in Germany, for \$2.25 more in Belgium, \$4.10 more in France, and \$4.30 more in the Netherlands, skeptics don't see how the program can be worked out.

**A Way Out**—But the Schuman planners have provided safety valves for most of the high pressure problem spots likely to occur during the next 5 years. On the pricing issue, high cost countries will be given subsidies derived from levies on export prices of low producers. This revenue will be used to equalize prices. It is hoped that the high cost countries will be able to improve equipment and other facilities so that they can bring prices down to a competitive level by the time the 5-year transition period is over.

As part of the steel pool plan,

a tax of about 1 pct will be levied on the average value of the pool's coal and steel output. This fund will be used to pay administrative expenses, to finance rehabilitation of workers who lose jobs when unprofitable concerns are forced to close, to pay interest on loans received for industrial improvement, and for technical and economic research.

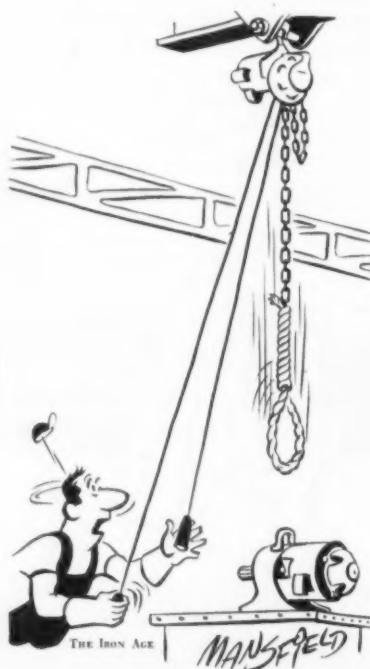
**Who Gets What?**—Disbursal of these funds for industrial improvement is already causing a few headaches. France is reported to be asking for \$180 million per year for new investments, but the other nations believe \$85 million should be enough. The Germans want to put \$450 million into plant modernization programs, while other members believe it should only get \$170 million.

These problems can be solved only through compromise and cooperation. Main weakness of the Schuman Plan is that it can be upended if a few of the major industrial firms refuse to follow the program.

**Need Outside Help**—Success of the European Coal-Steel Community also hinges on cooperation of nations outside the pool. Most of the Schuman Plan members have most-favored-nation agreements with countries outside the Community. These pacts stipulate that customs advantages granted to any single country must also be given to all members in the agreement.

Non-member nations have been asked to waive their rights in these agreements and the odds are that they will do so.

Because of its scope, national differences, and the economic disruptions that will occur, there will be a lot of vibration in the Schuman machinery when it starts. This is to be expected. But whether these forces will cause the program to break down cannot be determined. World peace may be in greater jeopardy if the plan does fail, Europeans fear.



## Controls

### STEEL PRICES:

Freehill charges OPS ceilings' end will bring steel price increases.

Government price controllers are still taking despairing pot shots at what appears to be overwhelming national opinion that price curbs are no longer needed. Latest sally in a losing fight comes from Joseph H. Freehill, Office of Price Stabilization chief.

Last week he hinted darkly that abandonment of price controls will mean a quick jump of \$3 a ton in the price of steel. He recalled steel industry statements that 1952 wage hikes would increase production costs \$12 a ton. Mr. Freehill conveniently deduces that this is \$6 a ton above the price increase approved by OPS.

**"No Heavy Inflation"** — Last week Mr. Truman's economic message indicated immediate prosperity and no heavy inflation likely. OPS directors have persistently seen storm signals in every white cloud and on several occasions in 1952 tried to stampede the nation into even tighter controls when the need was on the wane.

Mr. Freehill said, "We do not believe that the steel industry would raise its price that much (\$6 a ton), and we are aware that it may not take any action immediately after controls are lifted, but removal of controls would promptly raise the prices of some of the items the steel industry buys and this would be an added motive for raising steel prices."

Industry sources say that Mr. Freehill has no idea of what the steel industry intends doing on prices. Later market factors will exert much influence on the price trend. But the steel industry is noted for holding the line on prices.

**Other "Arguments"** — Other highlights of the new OPS pitch for retention of price controls:

Immediate scrapping of price controls would add "well above \$3 billion per year" to business and consumer costs and the nation's tax bill.

### Industry Controls This Week

**Castings**—Amend. 9, CPR 60 defines castings and states which regulations are applicable to the different types.

**Cast Iron Fixtures** — Amend. 1 to Sup. Reg. 26, CPR 22; effective Jan. 17, allows about 1.85 pct increase in manufacturers' prices for enameled cast iron plumbing fixtures. No further increase may be obtained on these items under GOR 35. Amend. 6, GOR 35 adds enameled cast iron plumbing fixtures to Appendix C of GOR 35.

**Coal, Coke**—Amend. 1, CPR 21 authorizes suppliers of coal used as bunker fuel to increase ceiling prices to cover increased transportation costs. Amend. 14 and 15, SR 13, GCPR permits coal tar processors and operators of beehive coke ovens to raise ceiling prices an average of 6 pct.

**Machinery**—GOR 42 enables manufacturers of machinery and related manufactured goods to establish new ceiling prices if the level of ceiling prices previously in effect are below the minimum established the industry

earnings standard. Amend. 44, CPR 30 permits these same manufacturers to apply for approval of changes in their list prices and discounts if these changes do not increase the general level of ceiling prices.

**Metal Inventories**—NPA has lifted inventory controls from some gray iron castings, malleable iron castings, aluminum foil and powder, cerium metal and alloys, natural graphite, iridium, and copper chemicals.

**Mill Rolls** — Amend. 9 to CPR 60, effective Jan. 13, insures that all producers of cast rolling mill rolls will set ceilings under the same order.

**Steel**—SR 2, CPR 31 establishes specific tonnage markups to be used in computing ceilings on imported steel. Markups of \$15, \$20 and \$25 per ton are provided for the three different categories of imported steel listed in SR 2.

**New Sellers**—Amend. 24, CPR 7 concerns retail ceiling prices for sellers entering business for the first time, sellers adding a category for which they cannot determine a ceiling price and other similar situations.

### STEEL: Output High in '52

As Reported to the American Iron and Steel Institute

	Openhearth		Bessemer		Electric		Total		No. Weeks in Month
	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	
<b>1951</b>									
January.....	7,846,657	101.4	431,725	90.4	570,084	88.8	8,848,466	99.9	1,997,396 4.43
February.....	6,938,993	99.3	326,112	75.6	507,302	87.5	7,772,407	97.2	1,942,602 4.00
March.....	8,061,346	104.2	408,926	85.6	606,358	94.5	9,076,630	102.5	2,048,901 4.43
1st Quarter.....	22,844,996	101.7	1,166,763	84.2	1,683,744	90.4	25,695,503	100.0	1,998,095 12.86
April.....	7,858,839	104.9	392,472	84.9	594,658	95.7	8,845,979	103.1	2,062,000 4.29
May.....	8,072,994	104.4	408,650	85.6	618,511	96.4	9,100,155	102.8	2,054,211 4.43
June.....	7,669,449	102.4	403,001	87.1	589,898	94.9	8,662,348	101.0	2,019,195 4.29
2nd Quarter.....	23,601,282	103.9	1,204,123	85.9	1,803,077	95.7	26,608,482	102.3	2,045,233 13.01
1st 6 months.....	46,446,278	102.8	2,370,886	85.0	3,486,821	93.0	52,303,985	101.1	2,021,801 25.87
July.....	7,706,078	99.8	411,599	86.4	566,818	88.5	8,684,495	98.3	1,964,818 4.42
August.....	7,694,965	99.5	436,822	91.5	607,308	94.6	8,739,095	98.7	1,972,708 4.43
September.....	7,653,801	102.4	404,726	87.7	601,830	97.0	8,660,357	101.2	2,023,448 4.28
3rd Quarter.....	23,054,844	100.5	1,253,147	88.5	1,775,956	93.4	26,083,947	99.4	1,986,592 13.13
9 months.....	69,501,122	102.0	3,624,033	86.2	5,282,777	93.1	78,387,932	100.5	2,009,947 39.00
October.....	8,028,121	103.8	458,128	95.9	635,037	98.9	9,121,886	103.0	2,059,116 4.43
November.....	7,750,845	103.5	411,954	89.1	636,553	102.4	8,799,352	102.6	2,051,131 4.29
December.....	7,885,830	102.2	396,831	83.3	608,017	94.9	8,890,678	100.6	2,011,466 4.42
4th Quarter.....	23,668,396	103.1	1,266,913	89.4	1,879,607	98.7	26,811,916	102.1	2,040,481 13.14
2nd 6 months.....	46,720,240	101.8	2,520,060	89.0	3,655,563	96.0	52,895,863	100.7	2,013,546 26.27
Total.....	93,166,518	102.3	4,890,946	87.0	7,142,384	94.5	105,199,846	100.9	2,017,842 52.14
<b>1952</b>									
January.....	8,103,123	100.7	407,298	89.3	625,696	89.7	9,136,117	99.3	2,062,329 4.43
February.....	7,703,066	102.4	382,712	89.8	571,432	87.6	8,657,210	100.7	2,091,114 4.14
March.....	8,401,140	104.4	378,881	83.1	624,190	89.5	9,404,191	102.2	2,122,842 4.43
1st Quarter.....	24,207,329	102.5	1,168,871	87.4	1,821,318	89.0	27,197,518	100.7	2,092,117 13.00
April.....	7,101,199	91.1	323,006	73.2	566,937	83.9	7,991,142	89.7	1,862,737 4.29
May.....	7,291,865	90.6	318,642	69.9	584,069	85.2	8,204,596	89.2	1,882,053 4.43
June.....	1,446,927	18.6	22,862	5.2	169,702	25.1	1,639,491	18.4	382,166 4.29
2nd Quarter.....	15,839,991	67.0	664,510	49.6	1,330,728	65.0	17,835,229	66.0	1,370,886 13.01
1st 6 months.....	40,047,320	84.8	1,833,381	68.5	3,152,046	77.0	45,032,747	83.4	1,731,363 26.01
July.....	1,347,587	16.8	2,000	0.4	277,371	39.8	1,625,958	17.7	368,090 4.42
August.....	7,599,888	94.4	309,361	67.8	589,438	84.5	8,498,687	92.4	1,918,440 4.43
September.....	8,039,128	103.4	331,620	79.8	671,357	99.6	9,062,105	101.9	2,117,314 4.28
3rd Quarter.....	16,986,603	71.2	662,981	49.1	1,538,166	74.4	19,187,750	70.4	1,461,367 13.13
9 months.....	57,033,923	80.2	2,496,362	62.0	4,690,212	76.1	64,220,497	79.0	1,640,789 39.14
October.....	8,747,640	108.7	347,042	76.1	712,148	102.1	9,806,830	106.6	2,213,731 4.43
November <sup>1</sup> .....	8,396,227	107.7	336,902	76.3	705,757	104.5	9,438,886	105.9	2,200,207 4.29
December <sup>2</sup> .....	8,664,000	107.9	343,000	75.4	676,000	97.1	9,683,000	105.5	2,191,000 4.42
4th Quarter.....	25,807,867	108.1	1,026,944	75.9	2,093,905	101.2	28,928,716	106.0	2,201,577 13.14
2nd 6 months <sup>2</sup> .....	42,794,470	89.7	1,689,925	62.5	3,632,071	87.8	48,116,466	88.2	1,831,613 26.27
Total <sup>1,2</sup> .....	82,841,790	87.2	3,523,306	65.5	6,784,117	82.4	93,149,213	85.8	1,781,737 52.28

Note—Percentages of capacity operated in 1951 are calculated on weekly capacities of 1,748,337 net tons openhearth, 107,806 net tons bessemer and 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of Jan. 1, 1951 as follows: Openhearth 91,054,020 net tons, bessemer 5,621,000 net tons; electric 7,554,630 net tons, total 104,229,650 net tons. Percentages for 1952 are calculated on weekly capacities of 1,816,637 net tons openhearth, 102,926 net tons bessemer and 157,477 net tons electric ingots and steel for castings, total 2,077,040 net tons; based on annual capacities as of Jan. 1, 1952 as follows: Openhearth 94,973,790 net tons, bessemer 5,381,000 net tons, electric 8,232,890 net tons, total 108,587,670 net tons.

<sup>1</sup> Revised.

<sup>2</sup> Preliminary figures, subject to revision.



## Contracts Reported Last Week

Including description, quantity dollar values, contractor and address. Italics indicate small business representatives.

Holding rings for VT fuze, 3288550 ea, \$151,273, Zalo Mfg. Co., Cleveland.  
 Dummy nose fuzes, 114990, \$42,831, Engineered Prod., Inc., Denver.  
 Holding rings, 1439944 ea, \$75,597, Sprague Devices, Inc., Michigan City, Ind.  
 Charge support rings, discs and spacers, 1331140 set, \$385,268, H. I. Thompson Co., Los Angeles.  
 Mine, At. heavy practice, 134617, \$869,626, American Bantam Car, Butler, Pa.  
 Spare parts for R436059B aircraft engine, var, \$1,640,534, Bendix Aviation Corp., South Bend, Ind., *G. I. Lyman*.  
 Pumps and motor, var, \$423,630, Vickers, Inc., Detroit, *R. M. McCabe*.  
 Strut assy, 30 ea, \$124,575, Douglas Aircraft Co., Santa Monica, Calif., *N. H. Shappell*.  
 Relay, 482 ea, \$89,483, Transco Prod., Inc., Los Angeles.  
 Pump, water and governor assy, var, \$88,810, Waukesha Motor Co., Waukesha, Wis.  
 Strut assy, 17 ea, \$70,593, Douglas Aircraft Co., Santa Monica, Calif., *N. H. Shappell*.  
 Wheel, 322 ea, \$42,756, B. F. Goodrich Co., Akron.  
 Maintenance parts used on var instruments, var, \$36,876, Sperry Gyroscope Co., Great Neck, N. Y., *George A. Dennis*.  
 Spare parts for P & W engines, var, \$189,632, United Aircraft Corp., East Hartford, Conn., *E. E. Champion*.  
 Stand, 30 ea, \$28,200, United Aircraft Corp., East Hartford, Conn., *E. E. Champion*.  
 Tools for propeller overhaul, var, \$150,532, United Aircraft Corp., East Hartford, Conn., *Adam C. Wolsz*.  
 Maintenance parts for var aircraft engines, var, \$51,528, Bendix Aviation Corp., Teterboro, N. J.  
 Carburetor, var, \$773,809, Bendix Aviation Corp., South Bend, Ind., *G. I. Lyman*.  
 Indicator, 1089 ea, \$185,031, Lewis Engr. Co., Naugatuck, Conn.  
 Spare parts for P & W engine, var, \$2,427,948, United Aircraft Corp., East Hartford, Conn., *E. E. Champion*.  
 Maintenance parts for P & W engines, var, \$751,086, United Aircraft Corp., East Hartford, Conn., *E. E. Champion*.  
 Spare parts for P & W engines, var, \$3,097,592, United Aircraft Corp., East Hartford, Conn., *E. E. Champion*.  
 Spare parts for P & W engines, var, \$234,400, United Aircraft Corp., East Hartford, Conn., *E. E. Champion*.  
 Spare parts for P & W engines, var, \$62,000, United Aircraft Corp., East Hartford, Conn., *E. E. Champion*.  
 Spare parts for P & W engines, var, \$2,037,737, United Aircraft Corp., East Hartford, Conn., *E. E. Champion*.  
 Spare parts for P & W engines, var, \$892,519, United Aircraft Corp., East Hartford, Conn., *E. E. Champion*.  
 Spare parts for P & W engines, var, \$215,282, United Aircraft Corp., East Hartford, Conn., *E. E. Champion*.  
 Spare parts for P & W engines, var, \$216,373, United Aircraft Corp., East Hartford, Conn., *E. E. Champion*.  
 Actuators and fitting assy for var aircraft, var, \$135,660, Air Associates, Inc., Teterboro, N. J.  
 Indicator, var, \$51,005, Bendix Aviation Corp., Teterboro, N. J.  
 Maintenance parts used on carburetor assy, var, \$33,342, Bendix Aviation Corp., South Bend, Ind., *G. I. Lyman*.  
 Spare parts for F4U aircraft, var, \$46,329, United Aircraft Corp., Dallas, *William H. Haugh*.  
 Indicator, gyre horizon, var, \$149,698, Sperry Gyroscope Co., Great Neck, N. Y., *George A. Dennis*.  
 Cartridge, storage case M13A1, 1000000, \$3,598,000, Automatic Washer Co., Newton, Ia.  
 Fuze, time, M65A1, 108000, \$170,100, A-P Controls Corp., Milwaukee.  
 Terminal box, 2535 ea, \$51,714, Cook Electric Co., Chicago.  
 Parts for 40 MM gun M-2, 25075, \$487,106, General Motors Corp., Pontiac, Mich., *M. F. Rummel*.  
 Flin. shell, M3, for 81 MM mortar, 900000, \$400,500, Schaible Co., Cincinnati.

Kit, heater, personal, 2000, \$445,100, Stewart-Warner Corp., Indianapolis, *A. N. Phillips*.  
 Buckle, brass, 1222200 ea, \$106,737, Childs, Inc., Attleboro, Mass.  
 Lockers, clothes, aluminum, 1000 ea, \$37,282, Southern Steel & Stove Co., Inc., Richmond, Va.  
 Valves, gate, composition, 450 ea, \$30,265, Derbyshire Machine & Tool Co., Philadelphia.  
 Steel stabilizing rods for 2"75 rocket, 95025 ea, \$88,183, Conner Steel & Wire, New York.  
 VT fuze container, 491375 ea, \$140,951, National Can Corp., New York.  
 Parts for mount, mortar 81 MM M4, 4400, \$28,160, Consolidated Cae-Heating Co., Inc., Albany.  
 Parts for 155 MM howitzer M1, 5000, \$95,100, National Forge Ord., Warren County, Pa.  
 Replenishment of hardware, 28947, \$3,565, Keystone Bolt & Nut Co., New York.  
 Replenishment of hardware, 34600, \$4,000, Michigan Bolt & Nut Co., Detroit.  
 Replenishment of small arms parts, 100, \$322,050, Loner-Wood Tool Co., Detroit.  
 Replenishment of hardware, 61298, \$18,600, Willys Overland Motors, Toledo.  
 Replenishment of tanks & other combat vehicle parts, 81420, \$2,300, Bendix Aviation Corp., Sidney, N. Y., *A. W. Dietrich*.

Compasses, 48 ea, 155/118052/53Q, Jan. 27.  
 Pens, ruling, 216 ea, 155/118052/53Q, Jan. 27.  
 Pens, contour ruling, 288 ea, 155/118052/53Q, Jan. 27.

Armed Services Textile and Apparel Agency, New York.  
 Insignia, collar, var, 1290000 ea, 53-136B, Feb. 13.

Navy Purchasing Office, Washington.  
 Lockers, wardrobe, steel, 1307, 6869B, Jan. 29.  
 Trucks, lift hand pallet, 160, 1379Q, Jan. 28.

General Services Administration, Kansas City, Mo.  
 Pliers, angle nose, 144 ea, 2B-KC-25550, Jan. 26.  
 Wrenches, 600 ea, 2B-KC-25550, Jan. 26.  
 Wrenches, pipe, adjustable, 60 ea, 2B-KC-25550, Jan. 26.

Rock Island Arsenal, Rock Island, Ill.  
 Rod, slide, 16300 ea, 11-070-53-425B, Feb. 2.

Frankford Arsenal, Philadelphia.  
 Ring lever, var 22 itm, ORD-53-SP-292, Feb. 5.  
 Bolt latch, var, 8 itm, ORD-53-SP-299, Feb. 4.

Fort Devens, Mass.  
 Gas burning hot water heaters, 200, ENG-19-035-53-58, Feb. 3.

Navy Purchasing Office, Los Angeles.  
 Lockers, clothing, steel, 620 ea, 54556B, Feb. 4.  
 Ranges, gas, domestic, 275 ea, 55715B, Feb. 12.

## Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal and opening date. (Invitations for Bid numbers are followed by "B," requests for proposals or quotations by "Q.")

Watervliet Arsenal, Watervliet, N. Y.  
 Steel pin, parts for 20 MM, 50000 ea, 53-8B, Feb. 9.  
 Steel pin, parts for 20 MM, 50000 ea, 53-8B, Feb. 9.  
 Steel pawl, parts for 20 MM, 50000 ea, 53-80B, Feb. 9.  
 Steel racks, parts for 57 MM rifle, 1500 ea, 53-72B, Feb. 5.  
 Steel lever, parts for 57 MM rifle, 3600 ea, 53-72B, Feb. 5.  
 Steel link, parts for 57 MM, 425 ea, 53-72B, Feb. 5.  
 Steel bracket, parts for 57 MM rifle, 200 ea, 53-72B, Feb. 5.  
 Steel eyebolt, parts for 90 MM gun M1A1, 10000 ea, 53-74B, Feb. 4.  
 Alloy steel holder, parts for 105 MM howitzer M2A1, 6000 ea, 53-74B, Feb. 4.

Letterkenny Ordnance Depot, Chambersburg, Pa.  
 Body and engine parts for var military vehicles, 22 itm, 53-102B, Feb. 2.

Quartermaster Purchasing Div., Chicago.  
 Colanders, 7325 ea, 53-583B, Feb. 5.  
 Pans sauce, 4178 ea, 53-583B, Feb. 5.  
 Scoop kitchen, 7406 ea, 53-583B, Feb. 5.

Ordnance Tank Automotive Center, Detroit.  
 Valve, 20000, 53-939B, Feb. 2.  
 Washer engine heat control valve spring, 20000, 53-939B, Feb. 2.  
 Pin power take off, 200, 53-939B, Feb. 2.  
 Roller horizontal dragline, 1000, 53-939B, Feb. 2.  
 Lever shifter, 200, 53-939B, Feb. 2.  
 Rod handle, 400, 53-939B, Feb. 2.  
 Mechanism, 240, 53-949B, Feb. 2.  
 Mech elev and trav, 150, 53-949B, Feb. 2.  
 Pintel towing, 8000, 53-935B, Feb. 3.  
 Bracket assy, 144, 53-935B, Feb. 3.  
 Piston, 80, 53-935B, Feb. 3.  
 Lever, 240, 53-935B, Feb. 3.  
 Yoke, 4000, 53-935B, Feb. 3.  
 Body, 2000, 53-847B, Feb. 3.  
 Clamp, 2950, 53-950B, Feb. 5.  
 Handle, 2300, 53-950B, Feb. 5.  
 Retainer, 1300, 53-950B, Feb. 5.  
 Clamp cable, 8500, 53-950B, Feb. 5.  
 Cam adjusting shoe, 7500, 53-950B, Feb. 5.

General Stores Supply Office, Philadelphia.  
 Dividers, 8880 ea, 155/118052/53Q, Jan. 27.  
 Point, replacements, 9060 ea, 155/118052/53Q, Jan. 27.

## Construction

### Steel Awards and Inquiries

Fabricated steel awards this week include the following:

1100 Tons, Chicago, Halsted St. interchange, to American Bridge Co.  
 960 Tons, Red River, Minn., bridge S-543/2/ to Pittsburgh Des Moines Steel Co.  
 300 Tons, Tipton County, Ind., bridge 3574, to Bethlehem Steel Co.  
 215 Tons, Oteo County, Neb., bridge project S-228/6/, to Capital Bridge Co.  
 215 Tons, Dallas County, Ia., bridge S-798/2/ to Pittsburgh Des Moines Steel Co.  
 200 Tons, Pekin, Ill., hospital addition to Illinois Steel Bridge.  
 140 Tons, Lincoln, Neb., Oak Creek bridge to Gate City Steel Co.  
 115 Tons, Henry County, Ia., bridge S-2317/1/, to Allied Structural Steel Co.

Fabricated steel inquiries this week include the following:

3600 Tons, Maumee, Ohio, bridge.  
 2500 Tons, Ririe, Idaho, Bureau of Reclamation, Pen Stocks Spd, DS, 3839.  
 1000 Tons, Yankton, S. D., Cuyins Point Reservoir, Corps of Engineering, bids due Jan. 30.  
 1000 Tons, Riverdale, S. D., Garrison Power House, Corps of Engineers, bids due Feb. 10.  
 960 Tons, States of Minn. and N. D., Red River bridge project, S-543/2/.  
 685 Tons, Hillside, Ill., Rock River bridge.  
 615 Tons, New Milford, Conn., bridge over Housatonic River, E. S. Lawler, New Milford, Conn., district engineer.  
 344 Tons, Readsboro, Vt., 3 span continuous deck plate girder with approaches, located on Route (Vt.) over Deerfield River near Readsboro-Whitingham town and extending westerly.

Reinforcing Bar Awards this week include the following:

4700 Tons, Chicago, underground garage, to John W. Griffith and Sons.  
 4700 Tons, Riverdale, N. D., power house.

Reinforcing inquiries this week include the following:

6000 Tons, Yankton, S. D., powerhouse substructure stage 1, bids Jan. 30.  
 4000 Tons, Riverdale, N. D., power house and switchyard, bids due Feb. 24.

Steel piling inquiries this week include the following:

220 Tons, New Milford, Conn., bituminous concrete approaches and single square span curved chord Pratt truss bridge over Housatonic River, E. S. Lawler, Hartford, Conn., district engineer, Mariani Construction Co., New Haven, Conn., low bidder.



# HANDLING HELPS

by A.L.L.

## Here's a Winning Team

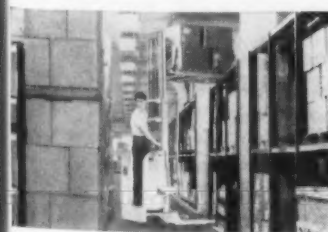
We've noted a trend: more and more users are cutting costs by teaming up their hand and power equipment. One case in point is this paint manufac-



turer's use of the Lewis-Shepard Jack-Lift Hydraulic Pallet Truck with their L-S Electric SpaceMaster. When you have short hauls or limited space, there's nothing so efficient and economical as a hand lift truck . . . especially when you make it supplement the heavier work of a power truck. Lewis-Shepard has a complete line. Check the potent possibilities. We'd be pleased to furnish you with more information.

## Increase your Storage Space 40-50%

Here's a fork truck that will right angle stack in less than 6 foot aisles, even with 48" long loads. The usual 10 to 12 ft. aisles can be reduced at least 40%, the extra space converted to



storage. It certainly beats building a new building, and the cost of this truck is half that of the standard electric fork truck. We're talking about the L-S Model "M" with a 3000 lb. capacity. If you want more information, it's yours for the asking. L-S has a variety of models, riding and walkie types, highlift or lowlift — designed for narrow aisle operation. Write Lewis-Shepard Products, Inc., 115 Walnut St., Watertown 72, Mass.

**Why  
fork truck  
dependability is vital  
to BEECH-NUT**



Ability to move and stack goods quickly and efficiently has a direct bearing on the profit picture at Beech-Nut Packing Company. That's why officials at Beech-Nut are particularly selective when buying materials handling equipment for their large-volume, fast-turnover business.

Mr. L. M. Spraker, Beech-Nut Materials Handling Engineer says, "The features that sold us on the Lewis-Shepard SpaceMaster Electric Fork Trucks are compactness and sturdiness of design. These two advantages give us the required maneuverability. And another thing . . . in any operation of industrial trucks, the amount of downtime can be a serious bottleneck in the flow of materials. Our Lewis-Shepard Trucks have an excellent record of dependability. My estimate of downtime is between 1% and 2% of our total operating time."

Lewis-Shepard SpaceMaster Trucks are reducing materials handling costs — boosting profits — in every industry. Why not prove for yourself their greater dependability and economy? Write for "Proof Booklet". Save time — use coupon below.

### HERE'S MORE PROOF OF LEWIS-SHEPARD ELECTRIC FORK TRUCK DEPENDABILITY

Listed are some current L-S reorders from blue-chip companies in various industries:

Paper Mfg.	had 26 — reordered 4
Gen'l Warehouse	had 8 — reordered 30
Piping Products	had 3 — reordered 2
Adhesive Mfg.	had 14 — reordered 1
Food Chain	had 44 — reordered 7
Elec. Equipment	had 17 — reordered 2
Cold Storage	had 8 — reordered 1
Chemical Mfg.	had 8 — reordered 3

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January 22, 1953



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For precision balls of unexcelled surface finish, sphericity, size accuracy and extremely fine tolerances, specify Universal Precision Balls.

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OF CHROME AND STAINLESS STEEL, BRONZE  
AND SPECIAL METALS.**

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Telephone. Willow Grove 1200

## Industrial Briefs

**Good Record**—GENERAL ELECTRIC CO.'s alkyd resin chemical plant in Anaheim, Calif., achieved a milestone in industrial safety at the end of 1952 with a half-decade of accident-free operation. The plant has a record of more than a quarter of a million man hours without a single lost-time accident.

**Joined Up**—W. E. Busker, controller, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., has been elected to membership in the CONTROLLERS INSTITUTE, New York.

**Going Up** — POWERED METAL PRODUCTS CORP. OF AMERICA, Franklin Park, Ill., has begun construction on a new plant addition.

**Replacement** — FRUEHAUF TRAILER CO. is constructing a new branch factory 1 mile south of Jacksonville on U. S. Route 1, which will replace the present branch at 1190 King's Road, Jacksonville.

**Ideal Rig**—THE NATIONAL SUPPLY CO., Pittsburgh, has a new medium depth drilling rig which is to be known as the Ideal Type 80-B Rig.

**Hoosier Rep** — HOMESTRAND, INC. Larchmont, N. Y., has appointed Clair L. Martin Co. its exclusive representative in Indiana.

**Brr**—PHILCO CORP. will build a new plant for the manufacture of refrigerators and home freezers at Connersville, Ind.

**Southern Service** — CONTROL EQUIPMENT CO., 1222 Peachtree St., N. E., Atlanta, is a newly formed company which will provide southern process industries with complete sales and service facilities for modern control equipment. Robert P. Saunders and Chas. L. Saunders will head the new company.

**Relocated** — CONTINENTAL SCREW CO., New Bedford, Mass., has changed its address in Detroit to 10428 West McNichols Rd.

**For Foundries** — VANADIUM CORP. OF AMERICA, New York, has appointed Whitehead Metal Products Co., Inc., New York, its distributor for Vancoram products, principally to iron foundries in the Northeast.

**At Your Service**—GRIEVE-HENDRY CO., INC., has moved to a larger modern factory at 1811 19 W. Lake St., Chicago.

**Liquid Oxygen** — AIR REDUCTION SALES CO. will build a new liquid oxygen plant in Riverton, N. J.

**For Rent**—THE RAPIDS-STANDARD CO., INC., Grand Rapids, Mich., has gravity and belt conveyors on lease on a new rental plan.

**Shrap Jackets**—WESTINGHOUSE ELECTRIC CORP.'S subsidiary, Plywoods-Plastics Corp., Hampton, S. C., is producing U. S. Marine Corps body armor, called "shrap jackets" by American fighting men.

**Called Off** — FORMSPRAG CO., Detroit, has terminated a 5-year sales agreement with the Morse Chain Co. for distribution of Formsprag clutches.

**Study Hall**—MINNESOTA MINING & MFG. CO., St. Paul, has purchased a 125-acre tract of land for a long range building program for research purposes.

**Appointed Distributor** — REYNOLDS METALS CO., Louisville, has appointed Aluminum Distributors, Inc., Chicago, a distributor of Reynolds aluminum mill products.

**Tourists** — COLUMBIA TOOL STEEL CO., Chicago Heights, Ill., held an Open House for guests and members of the Calumet Chapter of the American Society for Metals. The group made a 2-hr plant tour.

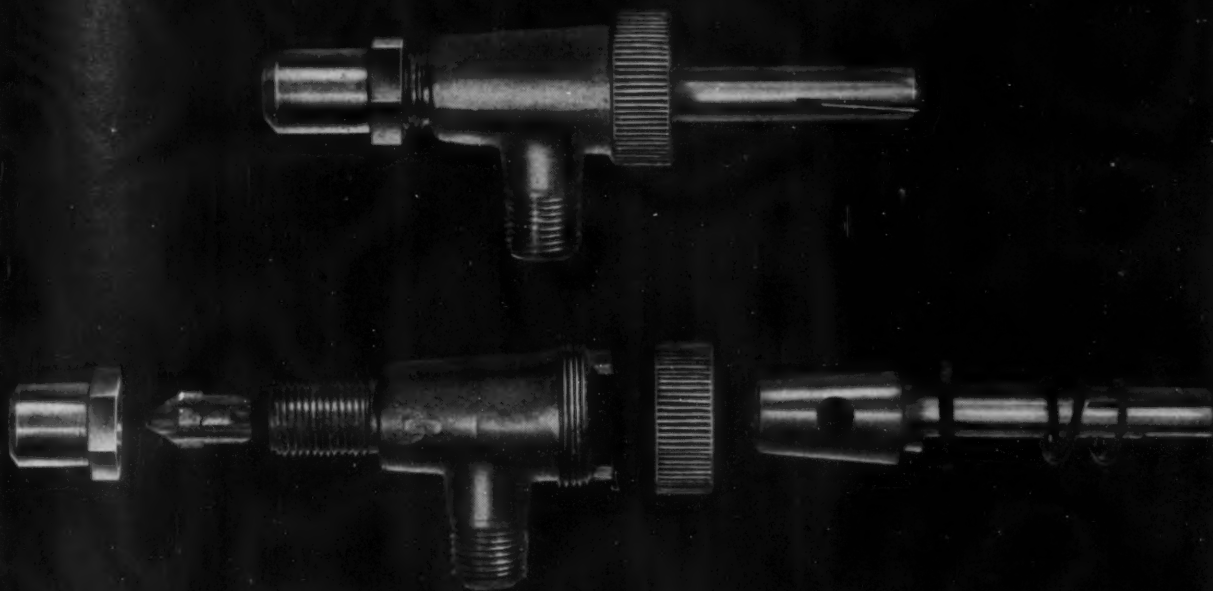
**Made Boss** — ASSN. OF STEEL DISTRIBUTORS, INC., New York, has elected Paul Goodwin, Eastern Steel & Metal Co., New Haven, Conn., eastern region chairman.

**Gets Job**—LURIA ENGINEERING CO., Bethlehem, has been awarded a contract for the erection of the first steel warehouse for direct distribution of low-carbon steel products in the Wilmington-Chester South Jersey area.

**In Action**—GENERAL ELECTRIC CO. has put in operation expanded facilities for the manufacture of silicone materials at its silicone chemical plant in Waterford, N. Y.

LINCOLN FINDS

# Brass is Best



Kitchen range burner valve by Lincoln Brass Works, Inc., Detroit 16, Mich. Two different brasses are used in this valve, which is entirely of brass except for the washer and spring. Lincoln also makes valves for heaters and furnaces; flow, drain and shut-off valves for gasoline lines; shut-off valves for agricultural sprayers, and a wide variety of tube and pipe fittings, all entirely or chiefly of free-cutting brass rod and free-machining brass forgings.

Mr. D. E. DuPerow, Vice-President of Lincoln Brass Works, Inc., recently said: "Thirty-six years of brass use by Lincoln and complete acceptance by the trade is the best reason I can think of for brass superiority. If there had been any material better for our purpose, less expensive to fabricate, and more desirable to our customers, we would be using it now."

Brass has many desirable characteristics. Here are five of them that are important in Lincoln valves and fittings: 1, corrosion resistance, which means no plating is required. 2, high speed precision machining for high output, lower costs. 3, sound, non-porous

structure of rod and forgings. 4, smooth performance; brass holds lubricants. 5, customer satisfaction; gas range burner valves pass the cycling test of being raised to 425°F. and back to room temperature a minimum of 10,000 times without seizure, loss of free operation, or leakage.

There are many other items besides valves that can profitably make use of the fine qualities of Revere Brass. The Revere Technical Advisory Service will gladly cooperate with manufacturers on the selection of the correct brass and its fabrication. Just call the nearest Revere Sales Office; see your telephone directory. Or write direct.

## REVERE

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## Alloys, Not Steel, Tough to Get

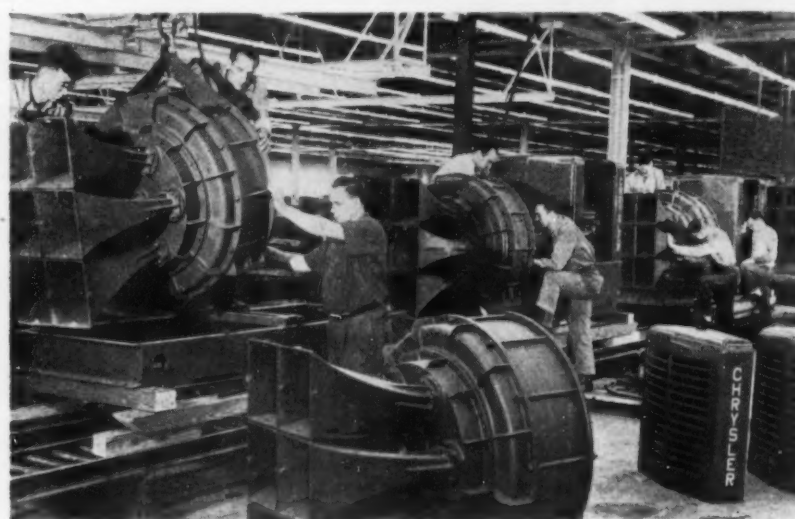
**Auto makers not worried about steel lack . . . Fear possible spot shortages . . . Alloying materials seen as big pinch . . . Nickel, copper warnings sounded by Cass—By R. D. Raddant.**

The dramatic struggle for steel that has been the major problem of the auto industry since June 1, 1952 has tended to obscure other materials problems.

But the alert auto manufacturer is now showing more concern over

to assume the SAE presidency. He is still a consultant to NPA to maintain a link with the agency.

**Optimistic**—While pessimistic on alloying materials and copper in terms of supply, Mr. Cass is more



**SIRENS:** Air raid warning sirens are a new product for Chrysler's fast-growing Marine & Industrial Engine Div. (See next page.)

less publicized but perhaps equally important spot shortages that may occur during the next few months. The industry can now expect more trouble in obtaining alloying material than in any other procurement operation.

These words of warning came directly from Robert Cass, the 1953 president of the Society of Automotive Engineers who took office in Detroit last week. Mr. Cass, who is assistant to the president of White Motor Co., speaks with authority on materials problems.

He has been on loan to National Production Authority during the past 18 months as director of the Motor Vehicle Div., a post he left

optimistic than most in his materials outlook, particularly in relation to controls.

Conceding that "perhaps" no one will agree with me," Mr. Cass contends that no automotive company is being hurt competitively and that our transportation system is not suffering under current controls.

Every car manufacturer feels, of course, that his company could grab a bigger share of the market under a decontrolled system. Mr. Cass merely contends that the situation is not unbearable in this respect.

Major cause of impending shortages in alloying materials will be due to stockpiling, Mr. Cass be-

lieves. He warns that nickel may possibly be cut back further, even to the point where it may not be permitted on bumpers.

**More Cuts**—Implication is that there are a number of persons in Washington who do not understand the functional aspect of nickel and are determined to remove it from all brightwork, functional or not. To complicate things, as auto production goes up, the tendency to cut nickel will increase.

While this applies to passenger car brightwork, the commercial field may suffer if nickel used in gear and axle construction is cut.

A further warning is that copper is again moving into the short category and that substituting for this metal may be an important factor before the end of the year. Copper supply has not kept pace with steel.

What are the hopes for decontrol? It now depends largely on the new administration's plans in Korea. If the war is not stepped up, there will be automatic opening later this year. If the Korean war is stepped up, as many people now believe likely, the impending copper shortage alone may warrant the continuation of CMP, Mr. Cass believes.

**New Spark Plugs**—With the introduction by several automakers of 12V electrical systems, a question frequently comes up on the new system's effect on spark plugs.

According to engineers of AC Spark Plug Div. of General Motors, the larger system does not require a different type of plug. While the 12V system will supply more voltage to the plug, it in no way affects the plug's "heat range" value.

However, in some instances the type of plug may have been changed in the new 12V equipped engine. Spark plug engineers say this is not caused by the system itself, but by the higher compression and increased power of the new engines.

*Turn Page*

The 12V system, incidentally, provides a greater opportunity for copper conservation in the wiring system. The higher voltage lends itself more readily to aluminum substitution. There is slightly less copper used in a 12V system, but not to the extent that it is a conservation factor in itself.

ENGINES:

**Chrysler's Industrial Div. makes GM's air raid warning sirens.**

Neighbors and tenants of the General Motors Building in Detroit get a weekly laugh at the expense of GM when the blatant sound of the air raid siren is heard in a weekly testing.

Reason for the humor is that the siren, which blasts from atop the GM Building, is made by Chrysler, GM's arch rival, in the Chrysler Marine and Industrial Engine Div.

Siren is the loudest ever devised for civilian defense. Testers received so many complaints that testing day was changed from Friday to Saturday so as not to unnerve sensitive office workers.

Siren is really just one adaptation of Chrysler industrial engines. It is powered by a Chrysler industrial V-8 engine.

Same siren is currently serving as the warning sound in Detroit, Chicago, Seattle, Oakland and several other U. S. cities.

**Fast Growing** — Industrial engine section of Chrysler, under General Manager C. C. Williams, is one of the fastest growing divisions in the corporation. It has just moved into a new plant south of Detroit in Trenton, Mich.

An industrial engine plant serves a double purpose. Not only does it tap an expanding field, but it enables the company to continue in production of engines required by the corporation after they have been eliminated in auto production.

Most of Chrysler's industrial engines start out as a conventional engine, but as many as 500 modifications may be performed, depending on the job the engine

is required to do. For example, it might have a 6, 12, or 24V electrical system.

Plastics Interest Still High

There is a lot of evidence that the use of plastics in the automotive field is an overworked project. Nevertheless, the session on plastic bodies at the Society of Automotive Engineers convention was one of the best attended meetings.

The engineers heard James Slayter, of Owens-Corning Fiberglas Corp., I. M. Scott, president of the Winner Mfg. Corp., and Earl Ebers, of the Naugatuck Chemicals Div., U. S. Rubber Co., discuss the role of fiberglas in

automotive body production.

Mr. Slayter said point blank that fiberglas is available now, but in a quality that takes up too much floor space. While convinced that fiberglas will do the job, he said that there must be an improvement in resins for faster molding. Otherwise, floor space would run into acreage.

He pointed to some parts that may see plastic utilization before the body proper. He said his company had developed an 11-lb bumper that performed the work of a 48-lb steel bumper, and in the same shape. His summation, however, came back to the fact that fabrication techniques have to be perfected.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS	TOTAL
Jan. 17, 1953.....	117,674*	30,854*	148,528*
Jan. 10, 1953.....	109,880	29,740	139,620
Jan. 19, 1952.....	70,708	27,961	98,669
Jan. 12, 1952.....	66,579	26,156	92,735

\*Estimated

Source: Ward's Reports

THE BULL OF THE WOODS

By J. R. Williams

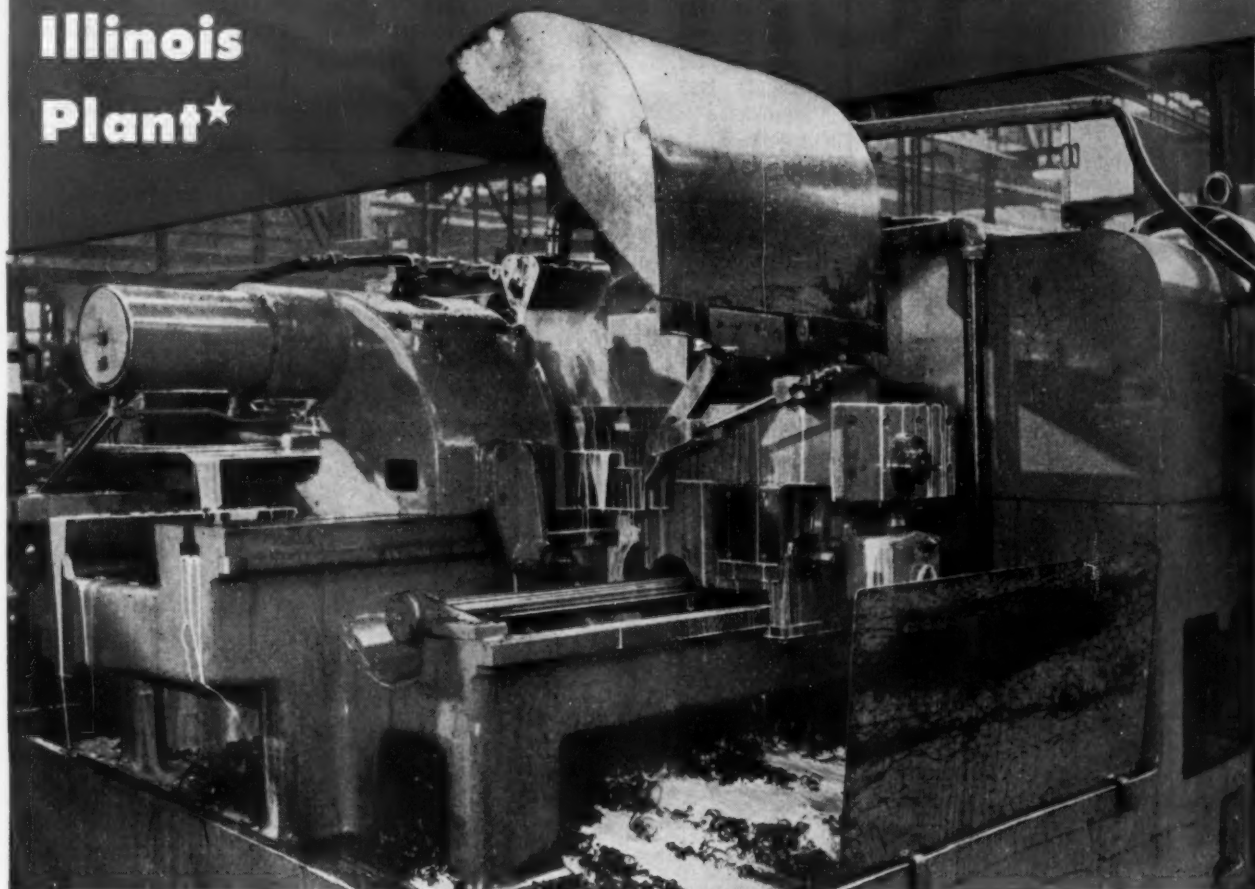


THE DISPLAY CASE

1-23 J.R.WILLIAMS

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# STABILITY . . . of Texaco Soluble Oil Emulsions proved in huge Illinois Plant★



★Name on request.

**T**his plant operates over 5,000 metal working machines of various types, and is located in a hard water area where emulsions of soluble oil are ordinarily difficult to maintain. Emulsions of *Texaco Soluble Oil HW*, however, have been used for years with success.

Last year, for instance, circumstances forced a two-month shutdown of the plant, and the emulsions of *Texaco Soluble Oil HW* were left standing in tanks and lines. When production was resumed, the operators found the Texaco emulsions still in satisfactory condition. There was comparatively little separation, little odor problem, and no wholesale cleaning of tanks or lines was necessary.

Here you have proof of the stability for which emulsions of Texaco Soluble Oils are famous — stability that means better cooling and lubrication, cleaner plant, longer tool life, lower oil consumption and maintenance costs.

Why not enjoy these benefits in your plant? There is a complete line of *Texaco Cutting, Grinding and Soluble Oils* to enable you to do all your machining better, faster and at lower cost. A Texaco Lubrication Engineer will gladly advise you. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



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MACHINING

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## This Week in Washington

### Is Delivered Price Decision Coming?

**FTC order against lead and paint companies sparks renewed clamor for legislation clarifying delivered price muddle . . .  
Get-tough policy on manpower draft—By G. H. Baker.**

Congressional demand for legislation clarifying the legality of delivered prices is boiling once again. The renewed clamor is sparked principally by the Federal Trade Commission's recent order (dated Jan. 16) demanding that three lead companies (National Lead Co., Anaconda Copper Mining Co., and International Smelting & Refining Co.) and three paint firms (Eagle-Picher Co. and Eagle-Picher Sales Co., Sherwin-Williams Co., and Glidden Co.) stop "price-fixing."

In the same order the commission forbids National Lead from acquiring any interest in competing firms at any time in the future.

**Meet Low Prices**—Rep. Francis E. Walter, D., Pa., who has attempted through several Congresses to obtain clarifying legislation, again is sponsoring a bill to permit any firm to meet, in good faith, any equally low prices.

Hearings on the Walter bill (H. R. 635) are tentatively scheduled by the House Judiciary Committee to get under way within the next few weeks. The bill is of particular interest to producers of steel, cement, chemicals and other bulky high freight commodities.

**F.O.B. on Bulk**—Because of the adverse ruling of the Supreme Court in 1948 against pricing practices in the cement industry, almost all bulky commodities—including steel—are now sold on an f.o.b. basis. Prices paid by customers reflect, in nearly all cases, the full transportation charges incurred between mill and destination point.

Because of good market condi-

tions during the past 4 years, there have been few, if any, casualties among companies located at great distances from their customers. But any return of a bearish market would inevitably mean that mills located far from their markets will lose some business to firms located nearer the market.

It is this type of economic difficulty that Mr. Walter seeks to avert.

**Get Tough on Draft** — Stretch-out of draft periods from 24 to 36 months is under serious consideration in the House. And a "get-tough" deferment policy also is being mulled over on Capitol Hill as a solution to the increasingly difficult problem of finding—and keeping—military personnel.

Industry's personnel managers would be directly affected by the adoption of either of these moves, as manpower specialists at the Capitol see it. Loss of trained per-

sonnel, already severe in the tool and die trades and in other industries requiring highly skilled workers, would become more of a headache to many firms holding defense contracts.

**Changes Forced**—Unpopularity of the draft—particularly in the Korean war—has always been a saddlesore to congressmen of both parties. But the cold fact that the Selective Service system has just about reached the bottom of the manpower barrel is slowly but surely forcing Congress to write some basic changes into federal draft law.

Alternative to longer periods of service and fewer deferments appears to be UMT—universal military training. But this is a hot political potato that neither party wants to pick up at this time. There seems to be little or no possibility that it will be enacted into law this year.

Draft calls, as a result, are to remain high. Draft Director Lewis B. Hershey would prefer Congress to order the tougher regulations. He's not happy at the prospect of putting them into effect on his own initiative. But the reserve of draft-eligible men—undrafted nonveterans 18½ through 25 years—is "about run dry."

**Protect Older Workers** — The rocky road of job-hunting traveled by men and women over 45 should be smoothed if Congress approves new legislation backed by three House Republicans (Fulton, Pa.; Javits, N. Y.; Morano, Conn.).

The problem of involuntary retirement (usually at 65) would also be substantially softened since the House proposal would bar employer discrimination against employees because of age. But the bill does not prevent an employer from taking into consideration such points as health, strength, hardihood, and the like.



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ARGENTINA .....	2	NEW CALEDONIA .....	2
AUSTRALIA .....	12	NEW ZEALAND .....	4
BELGIUM .....	2	NORWAY .....	2
BOLIVIA .....	2	PANAMA CANAL .....	2
BRAZIL .....	30	REP. OF PANAMA .....	1
CANADA .....	50	PERU .....	4
CHILE .....	11	PHILIPPINE ISLANDS .....	3
CHINA .....	17	POLAND .....	3
COLOMBIA .....	7	PORTUGAL .....	4
DENMARK .....	2	RUSSIA .....	69
ENGLAND (BR. ISLES) .....	70	SPAIN .....	26
FINLAND .....	4	SWEDEN .....	8
FRANCE .....	4	TURKEY .....	2
HAWAII .....	1	UNITED STATES .....	635
ITALY .....	16	URUGUAY .....	1
INDIA .....	9	VENEZUELA .....	1
JAPAN .....	2		

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\*REG. T. M. U. S. PAT. OFF.

MOORE RAPID  
WHEN YOU MELT...

# *Lectromelt*



## TRADE: Will DMPA Be Replaced?

**Congress may be asked to set up new agency for global procurement . . . DMPA scheduled to die in June . . . Larson says GSA can do the job . . . Foreign countries want MSA to go on.**

Congress may soon be asked to make further excursions into international trade. This would be done by setting up a new agency built along the lines of the expiring Defense Material Procurement Agency for long range buying of raw materials on a global basis.

Under present plans, DMPA is to be liquidated by June 30. It was created for the purpose of making put-and-take agreements for boosting domestic production and supplies of scarce materials.

Jess Larson, General Services Administration head, under whom DMPA functions, issued a year-end order for the splinter agency to gear all future operations for absorption by GSA.

"DMPA was set up strictly as an emergency," Mr. Larson told THE IRON AGE. "It has served its purpose and there is no reason why GSA cannot service its contracts. Folding up DMPA won't affect the stockpiling program one way or another."

**No Cash** — As proof that he meant business, Mr. Larson made no request in the proposed national budget for continuing the agency. Last year, \$515,000 was asked and specifically appropriated for DMPA salaries and other operating expenses.

During its existence of a little more than a year, DMPA has worked out and set up expansion programs for production of 17 different metals and 22 non-metallic minerals. It is estimated that these will be bringing about \$1.2 billion worth of new production by 1955—not including projects still under negotiation.

All but two of the metal programs and five of the non-metal programs are either completed or nearly so, at latest report.

An important phase of DMPA

work has been to provide or establish several purchasing depots in various parts of the country. These have been primarily for convenience of small producers. They would be operated in the future by GSA.

**Overseas** — In a lesser way, DMPA has been authorized to enter into foreign agreements looking to increased supplies of strategic materials. It took over a division of Mutual Security Agency, which had been doing that work.

Close working arrangements have been maintained with the Export-Import Bank for helping finance mining contracts and related work which are negotiated with foreign countries. More than one-half (53 pct) of the bank's 1952 commitments went for such purposes.

Specifically, more than \$314 million had been committed for these operations during the year. These included several African projects but not the recent \$67 million loan to finance production of manga-

nese from South American deposits partly owned by Bethlehem Steel Co.

At the turn of the year, projects had been developed and applications filed with the bank for foreign loans of about \$169 million.

Four foreign offices have been maintained under the DMPA setup. Presumably these would be returned to MSA. Its new administrator, Harold Stassen, expects to go abroad shortly to look over the whole MSA operation.

**Watching Closely** — But taking no chances, representatives of foreign nations in this country are watching developments closely. They want American aid continued in the form of both financial assistance and technical know-how.

Thinking of some of these countries has been put into words by Belgian Ambassador Baron Silvercruys. Just as Mr. Larson was announcing liquidation of DMPA, Mr. Silvercruys was proposing that the agency either be expanded or another like it be set up to carry on the program on a worldwide basis.

### Post-Attack Production Studied

Problems that could be expected in continuing the output of essential goods following an enemy assault on the U. S. are being appraised by William J. Hoff, newly appointed to Office of Defense Mobilization as "Assistant to the Director for Post-Attack Production Planning."

Involved in this planning are preventive measures to cut down potential damage to plants; procedures to offset any damage occurring; and action to get impaired facilities back into use without delay.

These measures, as ODM Chief Henry Fowler has indicated, will vary so greatly from industry to industry, and even from plant to plant, that producers themselves will have to make the main effort, with the government standing by to assist.







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### Rain Restores Northwest Power

**Firm power cuts revoked, with plans to bring back interruptible . . . "Cry Wolf" charges worry officials . . . Aluminum output climbing . . . Bonneville overflows—By T. M. Rohan.**

The rains came with a vengeance to the Northwest last week. Crippled production climbed back on its feet and industry generally got a badly needed shot in the arm.

Red-faced Bonneville power officials were still predicting more power cutbacks and urging the public via radio and TV announcements to conserve power the day before 110,000 kw firm power was restored. Preparations were under way to restore 200,000 kw interruptible next. Power officials were deeply concerned over expected "Cry Wolf" accusations and refusal to cooperate next year when the drought comes again and new power conservation pleas begin.

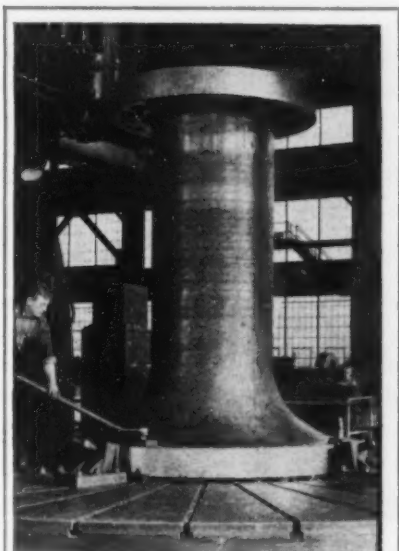
Aluminum loss, which has been estimated at figures varying between 250 and 400 tons daily, is due for a sharp reversal. Alcoa at Vancouver will get 14,000 kw and is planning 18.5 more tons daily; Reynolds will get 6000 kw at Longview, Wash., and 17,000 kw at Troutdale, Ore. Kaiser at Spokane will get 19,000 kw for the reduction plant and 3500 kw for the rolling mill, increasing production by 25 tons daily with five out of eight potlines operating. Alcoa at Wenatchee, Wash., will get 6000 kw increase from the county utility district.

**Record Downpour**—Water roared into shrunken streams, joining with snow melting up to the 5000-ft level to raise water flow at Grand Coulee from 22,000 cu ft per sec Dec. 31—lowest on record—to 53,000 cu ft per sec Jan. 15. At Bonneville water was spilling out because one of ten 54,000-kw generators burned out from overload. In Seattle 6 in. of rain fell in 2 weeks—equal to one-third the to-

tal rainfall in 1952—and was still coming down at week's end.

**Worst Power Cut**—Virtual absence of rainfall from midsummer until November made this the worst power season on record. Up to 1500 factories were affected and over 3000 people thrown out of work at an estimated \$1.25-million weekly payroll loss. Since the area is about 87 pct hydro-powered all available steam generation stations including mobile Navy units from California were pressed into service. And extra steam generation costs boosted prices to users. In 1951 only interruptible power, most of which is used by aluminum plants, was off just from Sept. 17 to Oct. 2.

**Steel Lost**—About 5000 tons of ingots were lost by Kaiser at Fon-



**READIED:** This 38-ton intermediate shaft is being prepared for shipment from Bethlehem Steel's Bethlehem plant to the McNary Dam hydro-electric plant on the Columbia River.

tana, Calif., last week in the unauthorized 1-day walkout of 68 openhearth cranemen. And at week's end 34 electric furnace men walked off the job at the Bethlehem's Los Angeles plant to attend a union meeting on an unspecified grievance.

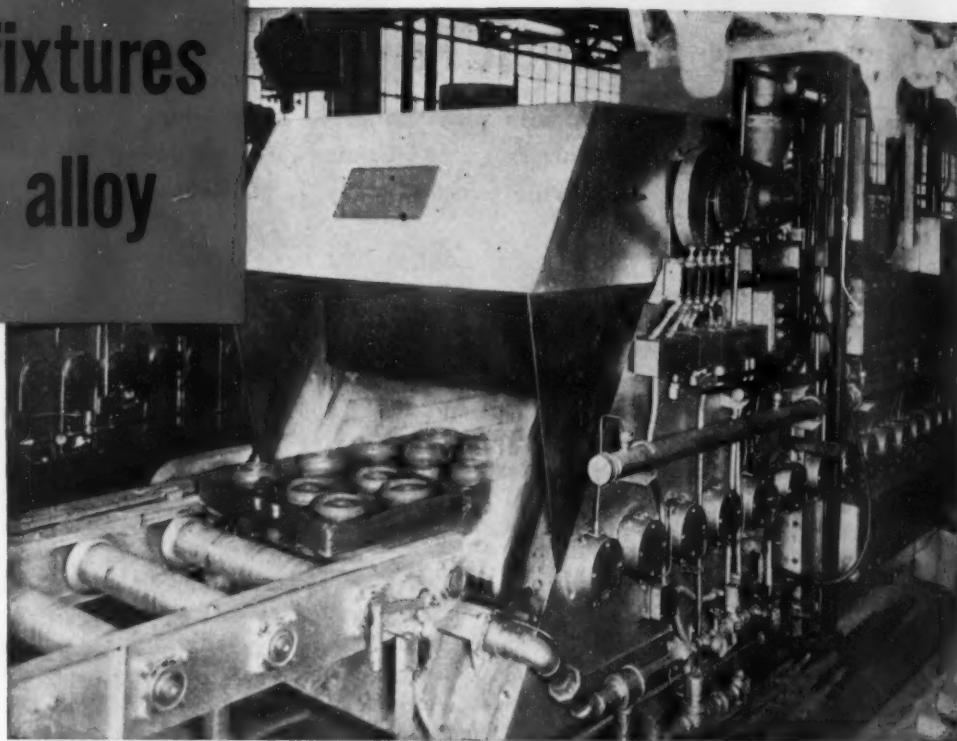
Earlier in the week one of three electric furnaces at Bethlehem was put out of operation for 3 days by an explosion which broke the lining and poured molten metal onto a water pipe, melting it. No one was injured but about 30 heats were lost.

The Kaiser strike started late Sunday over refusal of the men to service without more help the new ninth openhearth being put into preliminary operation. The two blast furnaces were banked, coke ovens put on reduced schedule, and all rolling mills except the primary one stopped. Second shift returned to work Monday after a conference with officials.

**'Tain't Our Fault** — Western steelmen had a ready answer last week for the forthcoming Defense Production Administration blast at the industry for concentrating expansion toward peacetime goods rather than defense. While true that western expansion has been toward tinplate and cold rolled sheet rather than structural mills, DPA has never detailed requirements and could have controlled expansion through screening accelerated tax write-off certificates. The financially-strained industry has naturally gone into its most promising market which is sheets.

Market for structurals in the seven western states is about 458,000 tons or only about 7.5 pct of the total western steel market of 6 million tons. Western production of standard and some wide flange structurals is about 300,000 tons—considered adequate for normal peacetime needs. Structural finishing capacity is also in excess of needs and by cutting consumer output could meet requirements.

## Refractory brazing fixtures replace alloy



## ... last 5 times longer

Automotive parts go through this furnace from cold, to 2100F, to cold, in 1 hour and 10 minutes. It's brazing on a volume basis.

The fixtures holding the parts were formerly made of a special heat-resisting alloy. These warped badly, and the parts often stuck to the fixtures. Attempts to overcome the warping by making the fixtures thicker resulted in fixtures which absorbed most of the furnace heat. They also added considerable load on the roller hearth.

When replaced with CARBOFRAX silicon carbide refractory fixtures, the weight per loaded tray was nearly halved, sticking was eliminated, and the fixtures *now last 5 times longer*. The new fixtures, of course, cost far less than the alloy.

Think what these advantages add up to in terms of labor, materials and down time . . . savings you may be able to duplicate where heat resistant metals are used in furnaces (e.g. skid rails, muffles, radiant tubes, roller hearths, etc.). For further data address Dept. B-13, Refractories Div., The Carborundum Co., Perth Amboy, N. J.

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# Machine Tool High Spots

## After Controls—Will Squeeze Be On?

**When controls go off, tool builders' may have to pay more for materials and labor without raising their own prices . . . Growing competition may cut profits—By E. C. Beaudet.**

Possible freeing of wage and price controls by April 30 may result in higher prices for some machine tools before the year is out. Although the industry's sales outlook is becoming more competitive each day, its labor and materials costs for the most part depend upon patterns established in larger industries. If they go up, builders will have to pay the increase regardless of their own downward trend.

Washington sources believe abandonment of wage and price controls at the end of April will inevitably lead to higher prices for materials and a slight increase for labor. These increased costs will not be felt until the last two quarters.

**Price Pressure**—Overall industrial activity during 1953 will continue at a rate at least equal to that of last year, if year-end business forecasts prove accurate. And strong demand by consumers will keep prices up.

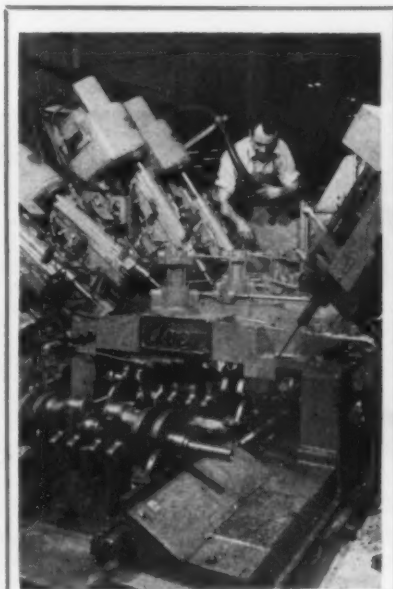
Others feel that a high level of production, given further impetus by abandonment of controls, will throw enough goods on the market to permit a downward adjustment. However, if prices don't fall, it is doubtful whether machine tool builders will be able to raise prices sufficiently to meet the increased cost of the things they buy. Growing competition may force them to absorb increased costs and suffer lower profit margins.

**Better Position** — Companies still carrying heavy backlogs of defense orders and firms making special equipment will be in a better position if it is necessary to raise prices, since customer resis-

tance will not be as great. Builders making general purpose equipment whose backlogs are below the average industry level will have a hard time selling a price increase in the face of a growing order scarcity.

Profit margins of some companies in the industry are expected to be lower, even if their costs remain the same. Reduced production schedules are already having an effect.

But some builders are looking forward to abandonment of wage controls. They feel it will put them in a better position in the competitive market for skilled workers. In some industrial areas, growth of defense plants, with wage patterns higher than those in neighboring machine tool plants, has resulted in a shift of labor and fairly high turnover. Ability to watch higher



**MULTIPLE DRILL:** Shown is an Avey transfer type drill for drilling all holes in oiling system in crankshaft for new Ford tractor engine.

wage scales will bring needed relief to these firms.

**Jet Propelled** — Expansion of the Navy's demand for J-53 jet plane engines will bring into production a \$50 million plant Ford Motor Co. is building at Romulus, Mich.

Lincoln-Mercury Div. of Ford, turning out the engines under license from Westinghouse, now has jet engine contracts totaling \$154 million. Benson Ford, general manager of Lincoln-Mercury, says he expects "first production engines" to be built this year.

**Subcontracts Scattered**—About 25 pct of the division's new auto assembly plant at Wayne, Mich., is being used for work on the J-40. Parts machining is going on at that facility and at numerous subcontractor plants.

The first-line Navy fighters, the Douglas F4D and McDonnell F3H, will be powered by the improved J-40.

Ground for the Romulus plant, a Navy industrial reserve unit, was broken last March 31. Containing 500,000 sq ft of floor space, the plant will have 18 engine test cells and a test building. Employment under full production will be about 1800 persons.

**Market Shift** — Although order backlogs continue to decline due to drop off in defense buying, a pick-up in civilian orders is partly offsetting the defense cutbacks. A few sales managers report being asked to refigure jobs placed with them as much as 5 years ago.

Strength of the civilian market is still not fully tested due to present defense restrictions, but increasing availability of machine tools is expected to scare up a lot of orders that were formerly shelved. A few industries reported to be more active in placing orders are those making electrical equipment, valve makers, and the oil well supply industry.

## FROM MINIATURES

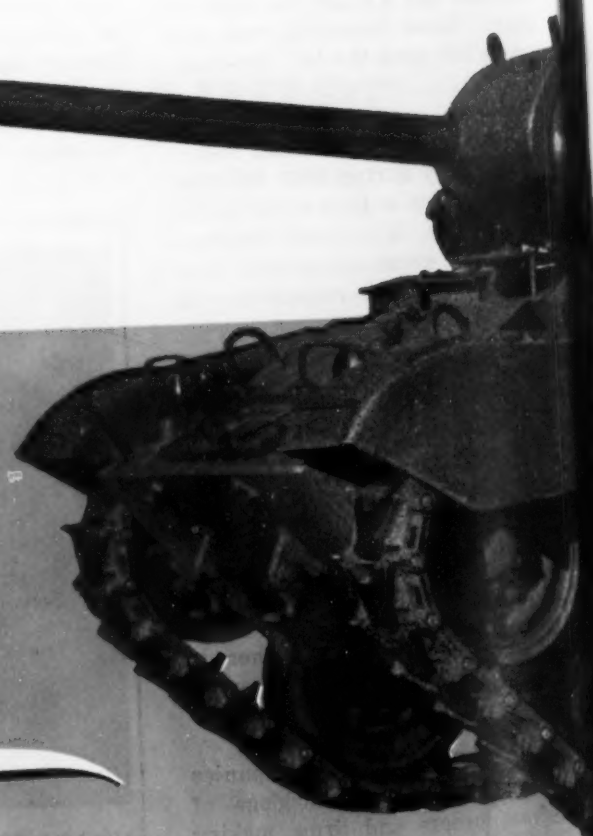


This three ton tank was produced in 1918. It accommodated two men, a driver and a gunner sitting side by side. Armament consisted of one 0.30 caliber machine gun with arc of traverse 21 degrees, vertical arc, 38 degrees. Power to drive this unit was provided by two engines 45 H.P. total. A planetary transmission having two forward speeds and one reverse was used. Maximum speed was 8 mph, and the fuel range was 34 miles. Dimensions were: length 13 ft 8 in.; width 5 ft, 6 in.; height 5 ft, 3 in.

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Our normal method of expressing tolerances in tenths-of-thousandths of an inch became inadequate when precision was attained to fractions of tenths-of-thousandths, expressed best in MILLIONTHS of an inch.

**Utmost precision proved by meticulous tests, and certified by Orlan W. Boston,** Chairman, Department of Production Engineering, University of Michigan. He witnessed tests at Frauenthal plant in Muskegon and certified their validity on precision grinding of a 37-inch test ring, on Frauenthal Grinder No. 18-110 (shipped to Fisher Body Division for grinding tank bearings).

### You get TOP PRECISION with Frauenthal Grinders

The certified readings listed at left are much closer than the 200-millionths of an inch precision specified for these machines. You can get similar results on other sizes of Frauenthal Multiple-Head Super-Precision Cylindrical Grinders, up to 140-inch diameter grinding on the Series 2200 machines. Uniformity of precision is assured in concentricity, parallelism and roundness. You can make many combination settings of grinding-spindle positions for a wide variety of simultaneous grindings of outside, inside and faces. Details on request.

Series 1800

## PRECISION GAUGE READINGS • CHART NO. 1

MAX. VAR. IN FACE THICKNESS (Parallelism)				MAX. VAR. IN WALL THICKNESS (Eccentricity)			
Station	Reading	Station	Reading	Station	Reading	Station	Reading
1	.000000"	7	.000000"	1	.000000"	7	+.000020"
2	+.000010"	8	+.000020"	2	+.000010"	8	+.000010"
3	+.000030"	9	+.000030"	3	+.000020"	9	.000000"
4	+.000030"	10	+.000030"	4	+.000020"	10	-.000010"
5	+.000030"	11	+.000030"	5	+.000010"	11	-.000020"
6	+.000010"	12	+.000020"	6	+.000020"	12	-.000010"

Maximum Variation in Parallelism: .000030" Maximum Variation in Eccentricity: .000040"

## PRECISION GAUGE READINGS • CHART NO. 2

MAX. OUT-OF-ROUND ON O. D.				MAX. OUT-OF-ROUND ON I. D.			
Station	Reading	Station	Reading	Station	Reading	Station	Reading
1	.000000"	4	-.000050"	7	.000000"	10	-.000110"
2	-.000020"	5	-.000080"	8	.000000"	11	-.000070"
3	-.000040"	6	.000000"	9	-.000050"	12	.000000"

Maximum Variation, Outside Diam: .000080" Maximum Variation, Inside Diam: .000110"

### What is YOUR Grinding Problem?

Through more than a decade of toolroom and production grinding, Frauenthal Grinders have been performance-proved on tough precision jobs, such as helicopters, jet engines, army and navy tanks and gunmounts, Diesel engines, machine tools, 120-inch diameter KAYDON precision bearings and similar products. We'll be glad to work with you on difficult grinding problems.

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Table sizes	30"	36"	42"	48"	60"	72"	110"	120"	130"	140"
Maximum Swing	56"	56"	56"	56"	72"	88"	120"	130"	140"	150"

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A two-hand, portable, on-the-job tool to cut round stock — bolts or rods. Multiplies applied power 80 times — 50 pounds on the handles means approximately 4000 pounds at cutting edge — and cuts easily in one movement and one second of time.

Saves labor, saves time, saves money — in shop or on the job. Sizes to cut from  $\frac{1}{4}$ " up to  $\frac{3}{4}$ " annealed bolts in thread.

Other models to cut flat stock, bars, wire, stranded wire rope, straps, chain, cable, etc. Made in fine tool quality to stand up in long hard usage. Every Porter Cutter you can use in your plant on repairs, dismantling, servicing or maintenance saves you money — get acquainted with the Porter Cutter line — write for catalog and consult your Industrial Supply House.

50 pounds pressure on the handles delivers approximately 4000 pounds at cutting edge.

H. K. PORTER, INC.  
Somerville 43, Mass.



## Free Publications

Continued

### Power saws

Featured in a new bulletin covering the entire line of Keller power hack saws are two new models, the No. 5 Hy-Duty, with a 9 x 9-in. capacity, and the No. 4 Hy-Duty, with a 7 x 7-in. capacity. Both of these units have variable pressure feed control. This makes it possible to cut thin walled tubing or heaviest bar stock with proper feed at maximum cutting speed without injuring saw blades. *Sales Service Machine Tool Co.*

For free copy circle No. 14 on postcard p. 67.

### Rock drills

An air-leg rock drill combination designed as a completely integrated unit and known as the JR-38 Jackdrill, is said to have features not available in Jackhammer air-leg combinations. The most radical innovation is a built-in air coupling between the drill and the feed leg, which does away with the third hose needed in other combinations. Complete information is contained in a new publication. *Ingersoll-Rand Co.*

For free copy circle No. 15 on postcard p. 67.

### Presses, valves

Coincident with its 150th anniversary, R. D. Wood Co., manufacturers of hydraulic presses and allied equipment, recently re-issued a booklet of photographs covering many of the company's production divisions. The publication gives an informative insight of the company's facilities, methods and equipment used in the manufacture of hydraulic presses and valves. *R. D. Wood Co.*

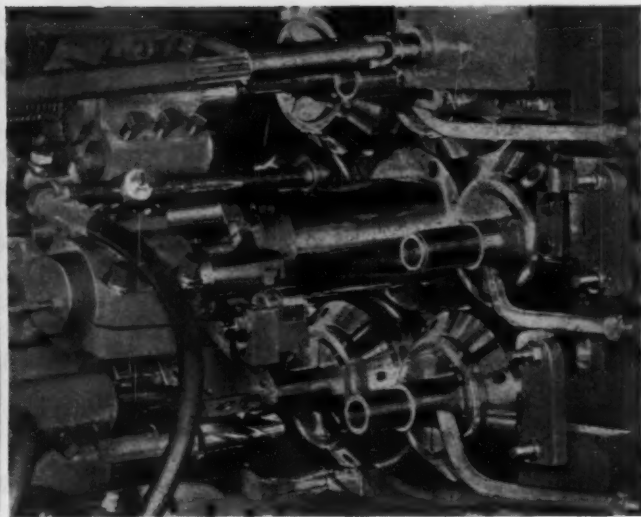
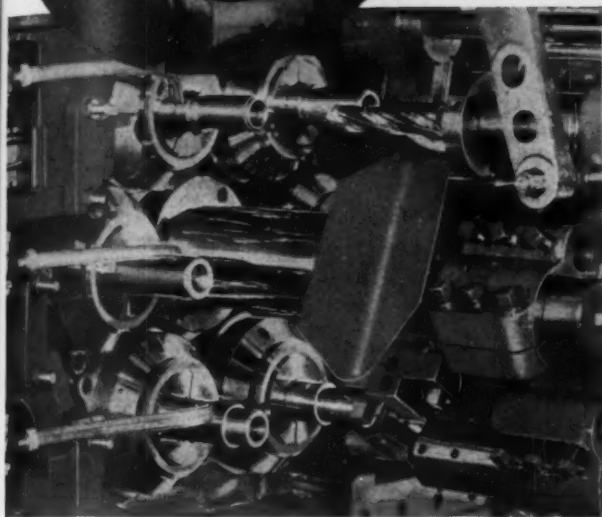
For free copy circle No. 16 on postcard p. 67.

### Motor generators

Engineered motor-generator sets for all industries are the subject of a new 4-p. bulletin recently issued, which briefly describes the company's complete line of M-G Sets, shunt or compound wound, from  $\frac{3}{4}$  to 1000 kw, designed to provide power for constant-voltage or adjustable-voltage systems. They include synchronous or induction motors. *Reliance Electric & Engineering Co.*

For free copy circle No. 17 on postcard p. 67.

## NO NEED TO "SETTLE" FOR LESS



FRONT AND REAR SIDES OF 2 1/2-SIX

Multiple Spindle Bar Automatics produce more work per square foot of floor space than do other types of metal cutting machine tools. But, when *one* spindle is "down" *all* are "down." It's why dependability will always be the outstanding requirement of the "Automatic."

So many factors are involved in dependability that any weakness in design, engineering, material, or construction, will eventually contribute to higher costs of operation and maintenance.

Part of any new machine's service to the prospective user is the availability of *full* information. No prospective purchaser need "settle" for less. At least it's that way with CONOMATICS.



In producing the piece shown, on a 2 1/2-SIX, the eccentric forming attachment (see upper right illustration) combines the well known CONOMATIC facilities of form tool support and "all position" attachment spindle drive.

*A Comparison of ALL Automatics is in favor of Cone*



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MACHINE COMPANY, INC.  
WINDSOR, VT., U.S.A.

# NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 67 or 68.

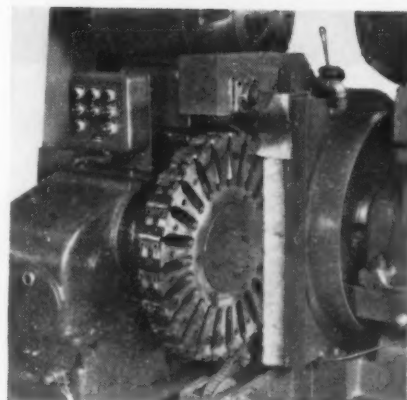


## Microflat honing machine has added versatility

New features on the Model 844 microflat microhoning machine (for precision finishing of optically flat surfaces up to 20 in. diam) include four different speeds in the head, simultaneous changing of spindle and wheel speeds, motorized wheel dresser mounted on machine, control of head oscillation, and pneumatic lift up of spindle. Spindle

speed may be changed, independent of wheel speed, by simple insertion in the head of any one of four worm gears, ranging from single to quadruple thread. Direction of spindle rotation is controlled by a clutch that has three positions: forward, neutral, and reverse. *Micro-matic Hone Corp.*

For more data circle No. 18 on postcard, p. 67.

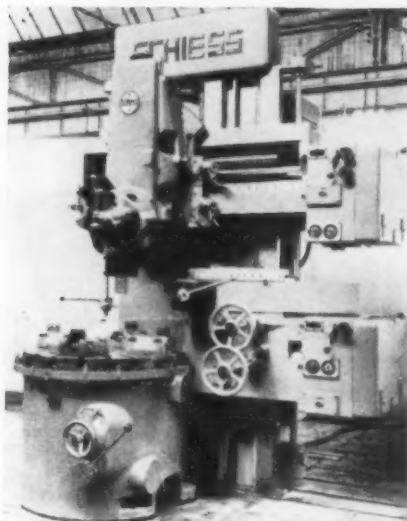


## Machine rough grinds turbine blades

Double spindle grinder rough grinds parallel ends of turbine blades on a high production basis. These ends are cleaned up preparatory to a hardness test made on the ground surface. The machine consists of a heavy cast iron base supporting two grinding heads upon dovetailed slides operating on ball bearing ways. A rotary attachment carries a work-carrier having approxi-

mately 26 slots into which the turbine blades are manually loaded. A chain hold-down attachment holds the workpieces into the carrier during the grinding operation. They unload automatically after leaving the hold-down. Production is at the rate of 20 to 25 pieces per min, removing 1/16 in. maximum stock per end. *Gardner Machine Co.*

For more data circle No. 19 on postcard, p. 67.



## Vertical turret lathes for high-speed machining

Newly designed Schiess single column vertical turret lathes intended for high-speed machining with carbide tools are available in 39, 49 and 65 in. turning lengths. KE series has an all-vertical gear drive with the main motor mounted in a vertical position on the back of the machine and directly connected to the gear box through a vibration-absorbing coupling. Gear box is vertically mounted so that changes in the direction of the drive are transmitted to the table without bevel gears. Vibration and play are

thus eliminated. Separate column and table base construction permits fine adjustment and close table tolerances against the column ways for cross rail and vertical ram. Hydraulic pre-selection of speeds can be made while the table is rotating. Desired speed is set by a handwheel and read on an illuminated dial. Sixteen spindle speeds in a ratio of 1:50 are provided. Maximum table speed of the KE 100 model, illustrated, is 310 rpm. *Kurt Orban Co., Inc.*

For more data circle No. 20 on postcard, p. 67.

Turn Page



Here at Sterling Bolt Co., a single, integrated **DEPENDABLE** source can supply you with more than **200,000** stock and standard sizes in Bolts, Nuts, Screws and Washers for your specific needs.

For more than 35 years Sterling Bolt has been a prime supplier of metal fastenings to America's best-known companies—because Sterling facilities combine both warehouse and mill, giving you advantages of **PROMPT SERVICE** and **COMPETITIVE DISCOUNTS**.



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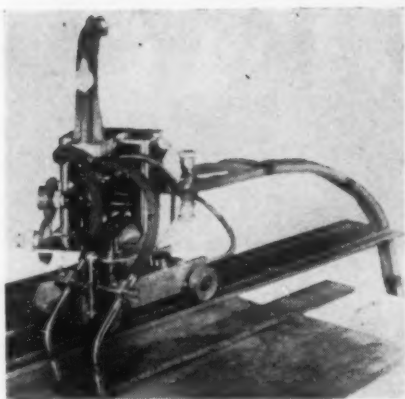
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## New Equipment

Continued



### Automatic device clads steel surfaces

A perfect chemical bond between lead and steel is created by a new versatile automatic machine. The steel is first prepared through lead-izing and then lead of any desired thickness can be applied. It is said not to separate from the steel in service unless it is melted off at temperatures close to 621°F. Such machines will chemically bond a strip of lead up to 12 in. wide x 1/4 in. thick to prepared steel. Operator

can control width and thickness of the lead cladding by regulating speed of machine and by spreading or narrowing the two cladding heads with which it is equipped. A hand-operated model may be used to burn lead to lead as in welding sheet lead and pipe. Weighs less than 10 lb, operates on a single wheel or tripod arrangement. *Knapp Mills, Inc.*

For more data circle No. 21 on postcard, p. 67.



### Perfect tool alignment is automatic

Smaller body design and larger holding capacities are advantages of new axially-true, adjustable V-jaw Brookfield tool holders. The DB model has radically reduced body dimensions as compared with the DA model yet holds any diameter tool from 1/64 to 1/2 in. The GA model has increased body di-

mensions to make possible the holding of any diameter tool from 1/16 to 3/4 in. Precision ground working surfaces insure that the tool holder's shank and V-jaw section are permanently parallel within 0.0005 in. in 6 in. Run-out is less than 0.0001 in. per in. *Brookfield, Inc.*

For more data circle No. 22 on postcard, p. 67.

# how the **MAY-FRAN** **CHIP-TOTE** works for **INDUSTRY**

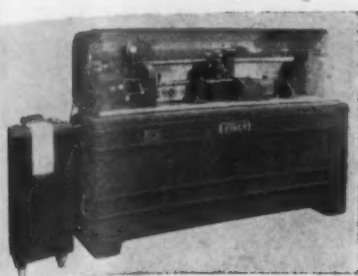
## AUTOMATIC SCRAP REMOVAL STEPS-UP PRODUCTION

CHIP-TOTES can remove borings, turnings and chips from practically all high-production machine tools while they are operating. These time-saving conveyor units are assembled from stocked component parts to meet specific requirements of each application. Their design permits flexibility of installation according to type of machine tool,

type of metal scrap, rate of removal, coolant flow, available space, etc.

CHIP-TOTES employ patented MAY-FRAN hinged-steel belting, which features interlocking side-wing design to prevent chip fall-through and assure continuous trouble-free operation. Perforated links can be furnished to permit drainage of coolant from chips.





## Checks contour and timing of engine camshafts

With a new camshaft comparator, engine camshafts are checked against a master cam to determine the variances in the cam contour of the part. The master cam is ground and lapped to 0.0001 in. accuracy. Cam contour variances

are shown on a 0.0001 in. dial indicator and simultaneously recorded on a linear chart. A wide range of sizes can be accommodated. Full inspection of a camshaft requires 30 min. *Vinco Corp.*

For more data circle No. 23 on postcard, p. 67.



## Giant drop forging hammer has one-man control

The latest steam drop hammer produced by Erie Foundry is rated at 50,000 lb. Shipping weight of the completed hammer, without dies, is in excess of 800 tons. When erected on its foundation the hammer extends 16 ft below the floor and approximately 30 ft above the floor. Despite the immensity of the machine it is easily controlled by one man using a foot treadle or hand levers. The giant hammer features a lubricating system of unusual design for lubricating the

guide V's. The distribution valve is a new counter-balanced type which permits extraordinary sensitivity of control. A key between each of the frames and the sow blocks keeps frames firm and prevents scale from working under the frame seats. Bottom cylinder head is integral with the cylinder, and is turned outside to serve as a huge dowel between cylinder and the tie-plate. *Erie Foundry Co.*

For more data circle No. 24 on postcard, p. 67.

**Turn Page**

The CHIP-TOTE has eliminated both machine down-time for scrap removal and manual scrap handling at the General Electric plant in Erie, Pa.

In this installation, brass chips from automatic lathe are funneled onto CHIP-TOTE's hinged-steel belt while lathe is operating. They are carried horizontally until clear of machine's mechanism and then up an incline for discharge into tote boxes. The CHIP-TOTE is synchronized with lathe's metal removing capacity to assure continuous jam-free chip removal. For maximum safety of operation, the chip conveyor is equipped with an adjustable clutch that disengages if pre-set load limit is exceeded.

903-MP

Write today for the new  
CHIP-TOTE catalog.



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**ENGINEERING INCORPORATED**

1698 CLARKSTONE ROAD • CLEVELAND 12, OHIO



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 <b>TRANSPORTATION RE-DESIGNED</b>	 <b>MINING RE-DESIGNED</b>	 <b>MACH. TOOL Original Design</b>	<p><b>5 OUT OF 8</b> <i>Re-designed!</i> <b>BY UNITCAST</b></p>	

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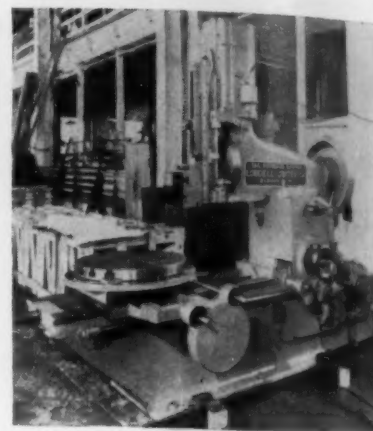
Give us a chance to offer a "cast steel" answer for your parts problem. Our suggestions while your product is in the design stage will pay continuous dividends.

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## New Equipment

Continued



### Improved slotter

Design changes and some streamlining for the sake of safety and easier maintenance have been incorporated in the Dill slotter. Improvements include a completely enclosed counterweight on the ram; forced feed lubrication, supplied by two hand-operated oil pumps, circulating oil to all moving parts; a new gear guarding arrangement which encloses all moving gear blanks in sections. The improved slotter will do more work in less time with greater safety. *Lobdell United Co.*

For more data circle No. 25 on postcard, p. 67.

### ID hole quencher

A method of case hardening holes is standardized with the new ID hole quencher. The machine combines the important principles of case hardening into an automatic procedure that speeds operations and produces a uniform high quality product. The quencher is automatic. The heated die-blank is placed into position on the anvil; air operated rams contact above and below; brine or other solution is pumped thru die hole. When hole quenching is completed, a kick-out ram automatically pushes blank into tank for overall normal cooling. Timing, temperature and pumping operations can be set on a predetermined cycle. Unit is adjustable to handle from 1/16 to 3 in. ID holes in blanks 1/4 to 8 in. OD and 1/16 to 6 in. long. *Palmer Mfg. Co.*

For more data circle No. 26 on postcard, p. 67.

## Powdered metal parts

Powdered metal gears, bushings, cams and a variety of structural parts can be produced with a new packaged kit. The kit consists of an electric motor driven hydraulic press of 100,000-lb capacity on the ram, a standard bushing, die, one 10-lb bag each of powdered metal mix, to produce brass, bronze, iron alloy and pure iron parts. Also included are a balance and weights, and full instructions for producing parts. *Metachem Laboratories, Inc.*

For more data circle No. 27 on postcard, p. 67.

## Wireless intercom

A new wireless communophone system, said to be as simple to install as a lamp or radio, can be used with two or more stations, with all conversation heard by all stations in the system. In most cases, a station can be located wherever there is a power outlet and readily moved from place to place. The system employs the power lines already existing in a building as the transmitting medium and utilizes a line noise suppression circuit in every unit. *David Bogen Co., Inc.*

For more data circle No. 28 on postcard, p. 67.



## Lifting magnet

High ratio lifting and saving of electrical energy are claimed for a new lifting magnet. Advanced design insures more payload per lift. Shape permits getting into corners; reduces supplementary hand work. It gives maximum lifting with minimum weight. *O. S. Walker Co., Inc.*

For more data circle No. 29 on postcard, p. 67.

Turn Page

# \*high production UNIFORM RESULTS WHENEVER *Surface* ROTARY HEARTH FURNACES ARE USED!



ANOTHER  
'SURFACE' SOLUTION  
TO PRODUCTION  
PROBLEMS

\*It's in the records of many prominent companies with mass production schedules—versatile 'Surface' Rotary Hearth Furnaces measure up to the job with profitable results. The experience of Ross Gear & Tool Company, Lafayette, Ind. is typical. Here, the clean hardening of steering arms and lever shafts is required.

A 'Surface' Rotary Hearth Furnace equipped with radiant tubes and an RX prepared gas atmosphere does the job. Steering levers and shafts—1,000 lbs. every hour—are

uniformly clean hardened. The furnace operates 24 hours a day and during two years of continuous service, has never been down for repairs. Only one operator is required for the operation.

For controlled atmosphere or direct-fired heat treating processes, it will pay real dividends to check the outstanding advantages of 'Surface' Rotary Hearth Furnaces in your production picture.

Write today for bulletin and for the full story on Ross Gear & Tool Company's experience.

**SURFACE COMBUSTION**  
*Corporation*

TOLEDO 1, OHIO

**'Surface'**

INDUSTRIAL  
FURNACES AND  
BURNERS

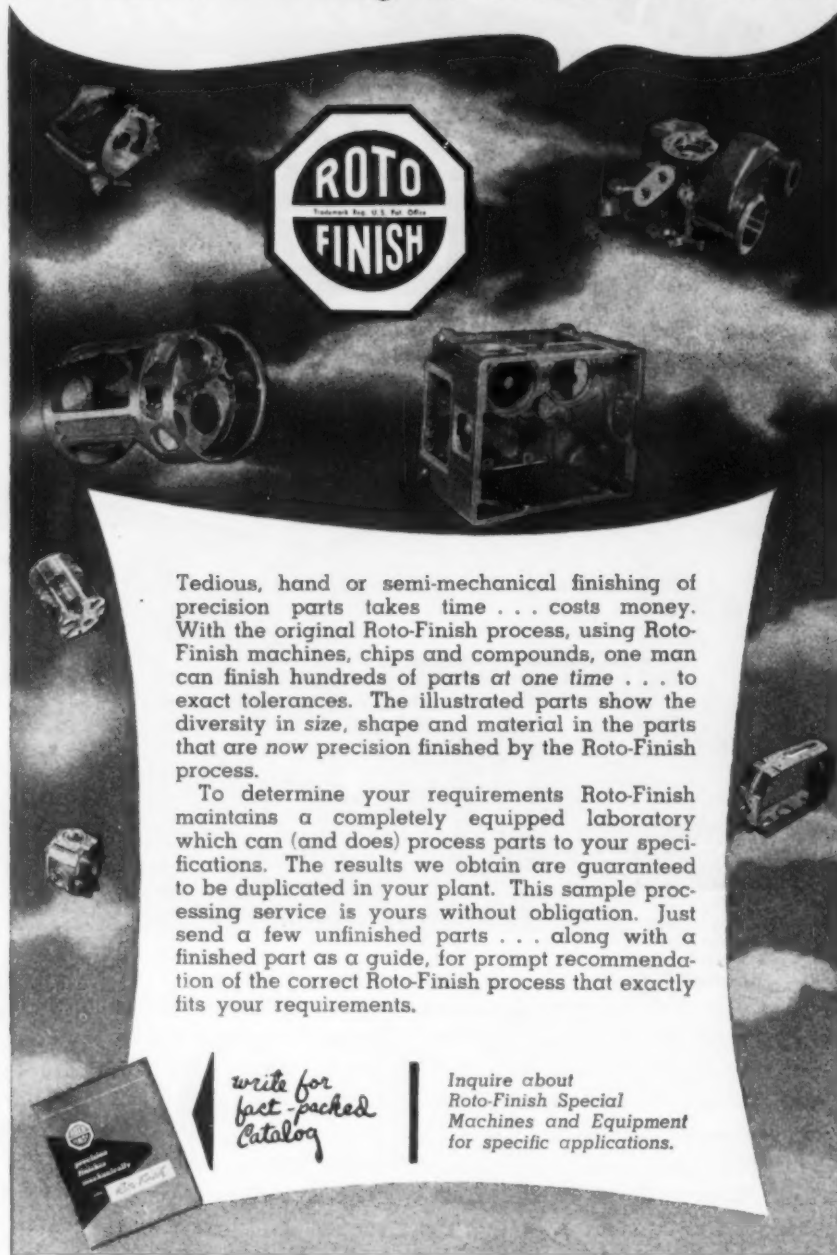
**Kathabar**

HUMIDITY  
CONDITIONING  
SYSTEMS

**Janitrol**

AUTOMATIC  
HEATING EQUIPMENT

# THE SKY'S THE LIMIT IN SAVINGS WHEN YOU *Roto-Finish* PRECISION PARTS



Tedious, hand or semi-mechanical finishing of precision parts takes time . . . costs money. With the original Roto-Finish process, using Roto-Finish machines, chips and compounds, one man can finish hundreds of parts at one time . . . to exact tolerances. The illustrated parts show the diversity in size, shape and material in the parts that are now precision finished by the Roto-Finish process.

To determine your requirements Roto-Finish maintains a completely equipped laboratory which can (and does) process parts to your specifications. The results we obtain are guaranteed to be duplicated in your plant. This sample processing service is yours without obligation. Just send a few unfinished parts . . . along with a finished part as a guide, for prompt recommendation of the correct Roto-Finish process that exactly fits your requirements.

*write for  
fast-packed  
Catalog*

Inquire about  
Roto-Finish Special  
Machines and Equipment  
for specific applications.

**Roto-Finish**

associated with The Sturgis Products Co.  
3712 MILHAM ROAD, KALAMAZOO, MICH.



COMPANY

P. O. Box 988—  
Phone 3-5578

FOREIGN REPRESENTATIVES: CANADA — Windsor — Roto-Finish Canada Limited • ENGLAND — London — Roto-Finish Limited — 39 Park Street — Mayfair • AUSTRALIA — Melbourne — A. Flavell Pty. Ltd. • HOLLAND — Delft — N. V. Roto-Finish Maatschappij — Rotterdamse — WEG 370A • AUSTRIA, GERMANY, SWITZERLAND — Frankfurt a.M. — Metallgesellschaft A.G., Germany • ITALY — Milan — Societa Roto-Finish a R.L. — Sesto S. Giovanni — Viale E. Morelli 31 • FRANCE — Paris — Societe Roto-Finish, 70 rue de la Republique-Puteaux (Seine) • BRAZIL — Rio de Janeiro — Commercial E. Industrial de Formas Werco, Ltda.

## New Equipment

Continued

### Form tooth slotters

Thinsaws with contour tooth forms are available for cutting slots that require a form. Various convex forms, including radius and radius with angles tangent and their variations can be produced to customer specifications. Thinsaw carbide tips are brazed into a circular pocket, providing better braze and assuring that tips will not come loose. *Gay-Lee Co.*

For more data circle No. 30 on postcard, p. 67.

### Coated fabric gloves

An improved Neox coating (reinforced neoprene) is being used on a line of black Neox coated fabric work gloves. More flexibility and better gripping qualities are claimed for the coating. It is more resistant to cuts, abrasions, grease, acids, caustics, solvents and heat. Two weights of coatings are available. Styles range from knit-wrists to 14-in. gauntlets. *Edmont Mfg. Co.*

For more data circle No. 31 on postcard, p. 67.



### Tote trucks

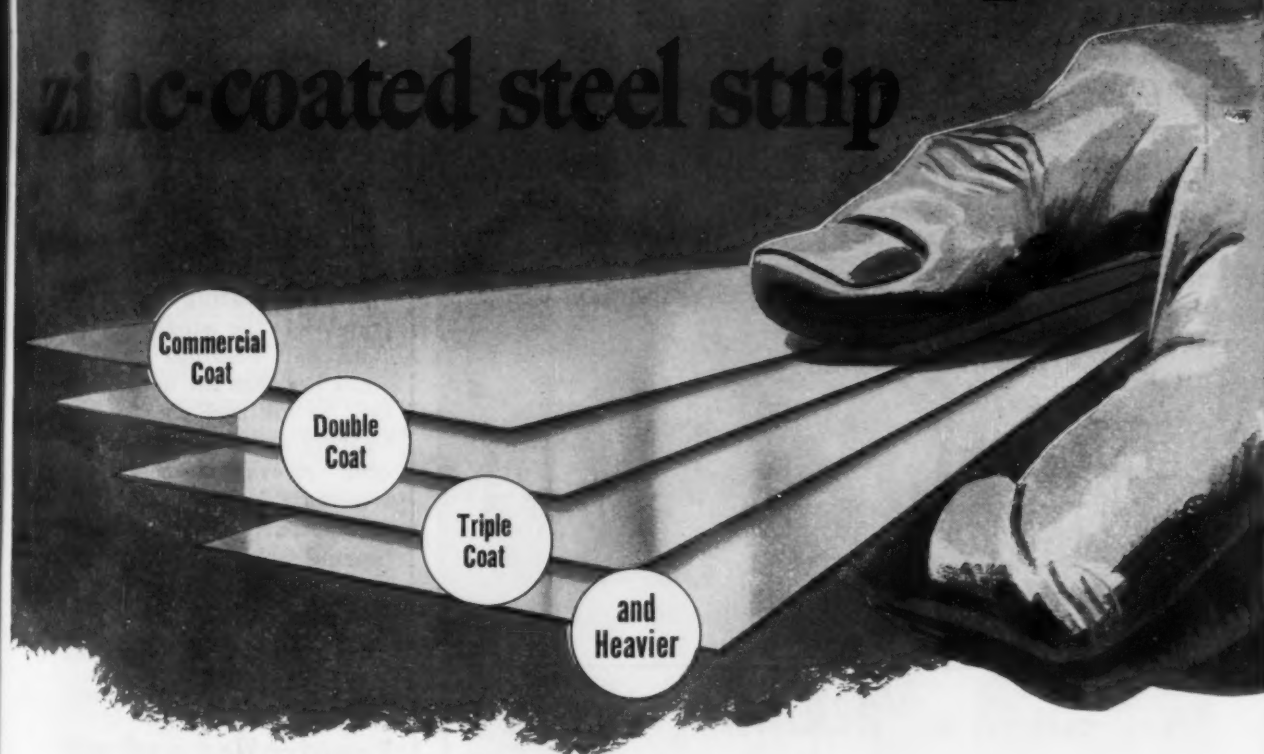
Featuring instant operation, new tote trucks operate on electric power supplied by special batteries, which carry an 8-hr power supply. By plugging into an electric circuit, the batteries are recharged over night. Two-wheel differential drive furnishes smooth power to take a full load over almost any type ground and up grades. Drum brakes set automatically when halted, release automatically when started. Three-wheel design gives the truck exceptionally short turning radius. Has six speeds forward and reverse. One-half ton capacity. *Electric Marketeer Mfg. Co.*

For more data circle No. 32 on postcard, p. 67.

Turn Page



# Now you can get heavier than commercial electro-plated zinc-coated steel strip



When your production standards demand extra protection from corrosion you can get it now with the *double, triple, and even heavier* electrolytic zinc coated Thomas Strip. This cold-rolled strip steel has a dense, uniformly distributed peel-proof zinc coating that adds substantially to product life and appearance. Coated edges can be furnished in most sizes.

In addition to the extra heavy zinc coatings, Thomas has facilities to handle the heavier gauges of strip in coils or cut lengths—thickness limits up to .125" (full range .005" to .125")—widths 1/4" to approximately 22".

Thomas electro-plated zinc strip may be formed, bent, and drawn without affecting the bond or causing flaking. Now it is available in

*commercial, double, triple, and heavier coatings.* It can be furnished bonderized in strip thicknesses of approximately .050 and lighter to provide extra adherence for paint, lacquer, and enamel. To learn how to put extra quality into your products with precoated Thomas Strip write today.

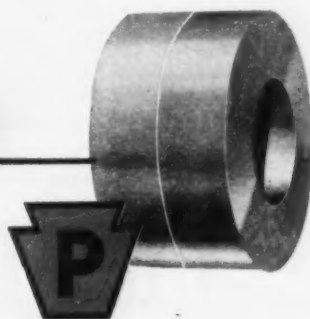
*Cold-rolled strip steel electrolytically pre-coated with Zinc, Copper, Brass, Nickel, Lead-Alloy, and Chromium in Natural, Planished and Buffed Finishes—Hot Dip Tin and Lead Alloy Coated—Lacquer Coated in Colors—Annealed Spring Steel—Alloy Strip Steel—Uncoated Strip Steel. Carefully produced to your specifications.*

# Thomas Strip

a product of

## Pittsburgh Steel Company

Thomas Strip Division • Warren, Ohio



## "New Process"

Punches • Dies • Rivet Sets  
Compression Riveter Dies

Made to highest standards and uniform quality thus insuring maximum service—  
**Since 1903**

Large inventory of stock sizes of round punches and dies, also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.

Write Dept. B for  
catalog 46



## GEO. F. MARCHANT COMPANY

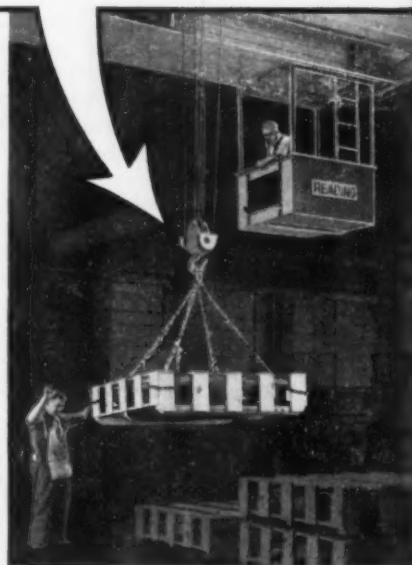
1420-34 So. ROCKWELL STREET • CHICAGO 8, ILLINOIS

## They picked a "READING" CRANE to shorten their load handling cycle ...

When this well-known stove manufacturer wanted to speed up assembly, he put his problem to "Reading" engineers. Installation of a 10-ton, double I-beam, cab-controlled "Reading" crane brought even greater results than expected. There are good reasons.

All "Reading" electric cranes — cab or floor controlled — are "job tailored". There is no extra cost for this special engineering service. Actually, costs go down, because motor, trolleys, brakes and hoisting units are assembled into a crane that fits your needs exactly.

You get greater operating efficiency. More accurate spotting is possible. Precise speed control is assured. Moreover, maintenance costs are minimized because each unit can be removed and serviced individually without dismantling entire crane. Get complete information by writing for our latest 16-page bulletin, "The Why and How of Faster Production".



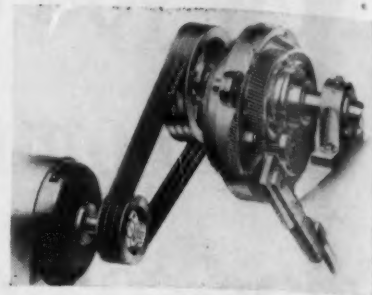
Chain Hoists  
Electric Hoists  
Overhead  
Traveling  
Cranes

READING CRANE & HOIST CORP. • 2101 ADAMS STREET, READING, PA.

# READING CRANES

## New Equipment

Continued



## Speed reducers

Shaft-King, a new series of 20:1 ratio speed-reducing units features improvements in gears, bearings, housing, lubrication and oil sealing systems. Gearing consists of two trains of the single-helical type. Both ball bearings and tapered-roller bearings are used where each can be utilized most effectively. Gearing and bearings are continuously splash-lubricated. Concentric shaft design places both input and output shaft above oil level; bearing seals do not operate against a head of oil. Shaft King speed reducers can be equipped with torque-arm overload release. *American Pulley Co.*

For more data circle No. 33 on postcard, p. 67.

## Penetrating end mill

A three fluted, center cutting, carbide tipped end mill is capable of penetrating end cutting as well as routing, etc. It is useful in places where the conventional carbide end mill cannot be used; is designed for nonferrous metals and nonmetallic materials. Stocked in straight shank and B&S taper shank in six sizes,  $\frac{3}{8}$  to  $\frac{3}{4}$  in. *Super Tool Co.*

For more data circle No. 34 on postcard, p. 67.

## Air weight control

New compensator, now standard in the Model 40 air weight controller for foundry cupolas, eliminates the effects of blower pulsations on control. The compensator adjusts the action of the controller, automatically correcting the rate of air flow for variations in atmosphere temperature and pressure. The air weight controller positions a valve in the blast line to admit the desired weight of air to the cupola. *Foxboro Co.*

For more data circle No. 35 on postcard, p. 67.  
**Turn Page**

# "We solve depth-of-hardness problems on low hardenability steels with **GULF SUPER-QUENCH**"

says James Mericka, President  
Steel Improvement Co., Detroit, Mich.

"One of our current jobs is quenching and drawing 1¼ x 22 in. cold-rolled pins for tank tractor treads," says Mr. Mericka, "and we have to through-harden these pins to 35-40 Rockwell C. Ordinarily this is quite a problem with some of the substitute steels, such as AISI 8150 and 8160."

"But by using Gulf Super-Quench, we've been able to meet this hardness specification on every substitute steel delivered to us. And we get a minimum of distortion and cracking with this fast-quenching oil, which results in fewer rejects and an improved profit picture."

This is typical of the results obtained in scores of metal-working plants with Gulf Super-Quench. For additional information on this quality fast-quenching oil, call in a Gulf Sales Engineer. Write, wire, or phone your nearest Gulf office.

**GULF OIL CORPORATION  
GULF REFINING COMPANY  
PITTSBURGH 30, PENNSYLVANIA**





## New Equipment

Continued



### Motor-crane has 30-ton lifting capacity

A 30-ton lifting capacity machine is available in Moto-Crane and Self-Propelled models. The Moto-Crane consists of a 30-ton capacity turntable mounted on an automotive type 3-axle carrier having 10 speeds forward and 2 reverse. It can travel over the highway at speeds to 30 mph; can travel over soft ground and rough terrain. Both

gasoline and diesel power plants are available. The self-propelled model is built for limited travel needs. The basic 30-ton turntable is propelled by the turntable engine which may be gasoline or diesel. Four speeds in both directions have top travel speed of 7½ mph. *The Shovel Co.*

For more data circle No. 36 on postcard, p. 67.

**CUT  
COST  
TO  
A minimum  
with the  
Demolition  
AND REMOVAL  
EXPERTS!**

**FURNACE TEAR OUTS • SALAMANDER OR SLAG REMOVAL  
MATERIAL HANDLING**

- 24 Hour Service  
7 Days Per Week
- World Wide  
Reputation

CONSULT US  
ON  
YOUR NEXT  
BLASTING  
PROBLEM

SERVING THE STEEL INDUSTRY FOR OVER 30 YEARS

# CHICAGO CONCRETE BREAKING CO.

PITTSBURGH, PA.  
530 Wm. Penn Place  
ATlantic 1-4674

EDWARD GRAY, President

GENERAL OFFICES:  
12233 Avenue O, Chicago 33, Ill.  
BAyport 1-8400

### Humidity indicator

For use in the dehydrated packaging of military materials and other products which must be kept in storage safe from moisture damage, a new device, the Bull's Eye, assembled as an integral part of the container itself provides a visual means of determining humidity conditions within the package without opening it. It is made of glass and contains Tel-Tale silica gel, a product which changes color from deep blue to light pink as it picks up moisture. *Davison Chemical Corp.*

For more data circle No. 37 on postcard, p. 67.

### Angle locknut pliers

Three special jobs for electricians can be done with new angle locknut pliers. It tightens locknuts in outlet boxes, removes burrs from steel tube or conduit, cuts and skins rubber covered wire. *Utica Drop Forge & Tool Corp.*

For more data circle No. 38 on postcard, p. 67.

### Torque-limiting wrench

A Proto precision torque-limiting wrench without the usual external indicating devices is suited for nut and bolt torquing by industries and mechanics. It employs a fully enclosed precision spring under compression as the principal torque controlling element. Desired torque is set by turning the handle, like a micrometer. When the right torque is reached by pulling the handle, the wrench releases automatically and signals the operator with a positive reflex action. Models with built-in reversible ratchet head are available that do the work of both ratchet and torque wrench. *Plomb Tool Co.*

For more data circle No. 39 on postcard, p. 67.

# The *Iron Age*

## SALUTES

*Earle M. Jorgensen*

Vigor and enthusiasm have built his company into one of the major western steel distributors.



**E**ARLE JORGENSEN'S whole method of operation is summed up in a slogan which has hung in his office for nearly 30 years—"HUSTLE, THAT'S ALL."

He is chairman and president of the Los Angeles steel distributing firm which bears his name. Yet he still refers to himself as "only a steel peddler."

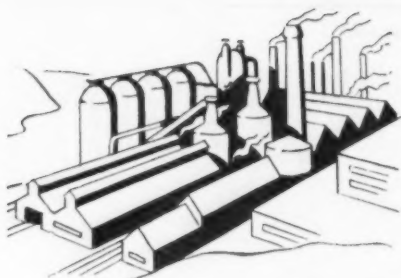
In the early '20s he started his career as a steel distributor with a cleared bean field for storage, a small corrugated iron shed for an office, and one Model T Ford truck. Earle peddled steel with such vigor and enthusiasm that his company has grown to be one of the major western steel distributors.

Besides its huge Los Angeles plant, which includes a forge division, the firm has warehouses in Oakland, Houston and Dallas. And it recently acquired large sites for warehouses in Tulsa and Chicago.

Visitors to Jorgensen plants are quick to observe the good housekeeping. Everything is shipshape, probably stemming from Earle's boyhood sailing on his father's ships between San Francisco and Hawaii.

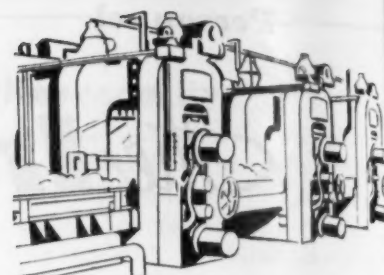
Most non-industrial people in southern California know Earle best as a leading worker for the Red Cross, Community Chest, YMCA, Chamber of Commerce and other civic enterprises.

He relaxes by riding horseback or playing a few fast sets of tennis.

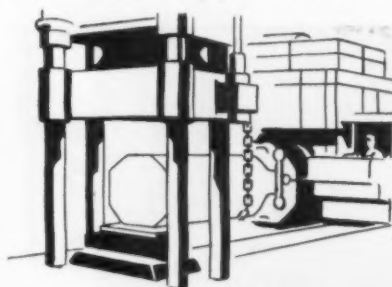


Steel Producing Plants

# WHEN A REGULAR LUBRICANT



Hot Strip, Cold Reduction and  
Temper Pass Mills



Forging Industries

ISN'T GOOD  
ENOUGH . . .

SPECIFY **LEADOLENE\***  
**Klingfast**

## CHECK THESE 9 IMPORTANT FACTS:

1. **EXTREME PRESSURE pH-ilm STRENGTH** of 50,000 lbs. per square inch minimum by "Timken" testing machine.
2. **ADHESIVENESS** in which affinity for steel and other metals develops maximum adhesion and prevents drippage or creeping. Retains a flexible coating in nature.
3. **WATER REPELLENCE** which retards washing off, creates a lubricating pH-ilm under moisture or water conditions.
4. **CORROSION PREVENTION** is an excellent protective coating in that it will not etch or corrode metals. Is never acidic.
5. **COMPOUNDED STABILITY**—Will not bleed or change physical condition within range of higher than usual temperatures for this type of lubricant.
6. **LOW TEMPERATURE FACTORS**—While having a solidifying action by decreased temperature as low as -40 F., it does not harden, crack or decrease in adhesion. The flexible coating withstands distortion of the application.
7. **ABRASIVE RESISTANCE**—Extremely high for a lubricant. Does not wipe off nor will be removed in handling by workmen's hands or gloves. Is extremely repellent to adhesion of scale, metallics and other forms of dusts or contamination.
8. Klingfast has remarkable corrosive resistance to salt or sea water, acidic vapors and solutions.
9. Klingfast can be removed by ordinary solvents such as kerosene, gasoline, naphtha, carbon-tetrachloride and similar substances but is highly impervious to lubricating oils and greases.

## The "I.P."\* LUBRICANT

On the really tough jobs in the steel industry, the answer to vastly reduced lubricating costs and extended equipment life is *Leadolene Klingfast*. Capable of withstanding pressures up to 50,000 p.s.i., this lead-base lubricant with its "indestructible pH-ilm" has proved itself repeatedly on the most difficult applications.

For efficient lubrication in the presence of water . . . for extreme adhesiveness to steel under high heat conditions . . . for unexcelled abrasion and corrosion-resistance . . . for actual cash savings up to 400 per cent—investigate the performance characteristics of *Leadolene Klingfast*.

\*I. P. . . ("Indestructible  
pH-ilm" lubricant)

Write for 24-page  
descriptive booklet

# THE BROOKS OIL CO.

Since 1876





# The Iron Age

## INTRODUCES

R. J. Murray, named vice-president in charge of sales, new VANADIUM ALLOYS STEEL CANADA LTD., London, Ontario.

Lyle B. Schueler, elected vice-president in charge of sales, DIAMOND POWER SPECIALTY CORP., Lancaster, Ohio.

S. E. Biggs, elected vice-president in charge of operations, YOUNGSTOWN STEEL CAR CORP., Niles, Ohio.

Walter F. Knebusch, appointed vice-president in charge of manufacturing, THE F. E. MYERS & BRO. CO., Ashland, Ohio.

J. C. Kuhn, appointed vice-president, Atkins Saw Div., BORG-WARNER CORP., Chicago.

Edgar G. Seybold, elected executive vice-president and director, HENDEY MACHINE CO., INC., Torrington, Conn.

John Kafka, appointed executive vice-president, LANE ORE & METAL CORP., New York.

Robert I. Howard, appointed vice-president and general manager, Distributing Div., New York, ADMIRAL CORP.

Jackson Kemper, elected vice-president, H. K. PORTER CO., INC., Pittsburgh.

Walter R. Hillman, appointed assistant to the vice-president in charge of production, EUTECTIC WELDING ALLOYS CORP., Flushing, N. Y.

Herbert M. Crowley, elected director, RAYMOND CONCRETE PILE CO., New York.

William H. Thompson, appointed director of commercial research, AMERICAN METAL PRODUCTS CO., Detroit.

Harold Burnip, appointed director of purchases, LINCOLN ELECTRIC CO., Cleveland.

Ralph L. Harding, Jr., appointed market research analyst, ALLEGHENY LUDLUM STEEL CORP., and Edmund C. Tynan, appointed to stainless tubing sales division, Pittsburgh.

R. M. Rowland, appointed director of merchandising, De Soto Div., CHRYSLER CORP., Detroit; and R. G. Roth, promoted to field training supervisor.

M. H. Osburn, named comptroller, INGALLS IRON WORKS CO., Birmingham.

Carter H. Gray, appointed assistant superintendent, continuous weld pipe mill, Fontana Works, KAISER STEEL CORP., Fontana, Calif.

Eugene A. March, appointed chief metallurgist, Sanderson - Halcomb Works, Syracuse, New York, CRUCIBLE STEEL CO. OF AMERICA.

W. R. Lockwood, appointed manager, Seattle steel service plant, JOSEPH T. RYERSON & SON, INC.

Murray B. Wilson, named manager of central area sales, ARMCO STEEL CORP., Middletown, Ohio.

Karl L. Mason, promoted to assistant research director, CATERPILLAR TRACTOR CO., Peoria, Ill.

Lawrence W. Sparks, named manager, watch case sales, RIVERSIDE METAL CO., Riverside, N. J.

O. M. Marquardt, appointed manufacturing manager, Tocco Div., OHIO CRANKSHAFT CO., Cleveland.

Andrew C. Perrin, named to post of west coast district sales manager, RELIANCE ELECTRIC & ENGINEERING CO., Cleveland.



JOHN L. CAMPBELL, elected a vice-president in charge of sales, The Ohio Steel Foundry Co.



GEORGE A. GADE, made vice-president in charge of sales, Standard Pressed Steel Co., Jenkintown, Pa.



JOHN A. SLENKER, named assistant vice-president of operations, American Steel & Wire, Div., U. S. Steel.

Some good things  
to know about  
Metal Cleaning

## Which of your metal-cleaning jobs would you like to improve?

Listed below are some of the operations discussed in Oakite's new 44-page illustrated booklet on Metal Cleaning. Please check the list. Then let us show you how Oakite materials and methods can give you better production with greater economy.

OAKITE PRODUCTS, INC.  
38H Rector St., N. Y. 6, N. Y.  
*Tell me (without obligation on my part) about Oakite methods and materials for the following jobs:*

- ☐ Tank cleaning
- ☐ Machine cleaning
- ☐ Electrocleaning
- ☐ Pickling
- ☐ Pre-paint treatment
- ☐ Paint stripping
- ☐ Steam-detergent cleaning
- ☐ Barrel cleaning
- ☐ Burnishing
- ☐ Rust prevention
- ☐ Send me a FREE copy of your booklet "Some good things to know about Metal Cleaning"

NAME.....

COMPANY.....

ADDRESS.....

SPECIALIZED INDUSTRIAL CLEANING  
**OAKITE**  
MATERIALS • METHODS • SERVICE

Technical Service Representatives Located in  
Principal Cities of United States and Canada

## Personnel

Continued

Warren A. Thomas, appointed manager, Re-Build Section, Sales Dept., Electro-Motive Div., GENERAL MOTORS, La Grange, Ill.

Charles J. Reiter, appointed assistant manager, General Order Dept., REPUBLIC STEEL CORP.; and H. E. McPherson, named district sales manager, Pittsburgh, to succeed Frank M. Welsh, who is retiring.

J. A. Tardiff, appointed works manager, new Montague, Michigan plant, HOOKER ELECTROCHEMICAL CO.; G. E. Duckwall, made plant engineer; and J. T. Rutherford, named production superintendent.

J. R. Alexander, appointed general sales manager, QUAKER RUBBER CORP., Div. of H. K. Porter Co., Inc.

Arthur F. Gerada, appointed sales engineer, UDYLLITE CORP., Cleveland district sales staff.

William E. Rogers, appointed sales manager, Skinner Electric Valve Div., SKINNER CHUCK CO.

C. W. Kalchthaler, appointed assistant to general sales manager, Harrison, N. J., HYATT BEARING DIV., General Motors Corp.

Howard A. Reid, becomes advertising and sales promotion manager, General Products Group, AMERICAN MACHINE & FOUNDRY CO.

Dwight W. Kaufmann, appointed assistant manager of sales, REM-CRU TITANIUM, INC., Midland, Pa.

Frank W. Cunningham, appointed manager of sales, POTTS-FARRINGTON CO., Philadelphia.

Paul F. Aaron, appointed plant manager, CINCINNATI TOOL CO., Cincinnati.

Robert W. Hundt, rejoins New York office of LURIA BROS. & CO., INC., as a trader.

William F. Taylor, named manager, Structural Sections Div., PENN METAL CO., INC.

Charles T. Crandell, appointed sales manager, Saxolin Open Mesh Dept., CHASE BAG CO., Chicago.

Gunther P. Franke, appointed general manager, A & S FORM TOOL CO.

Spencer Wolf, promoted to territory manager, CORY CORP., Chicago.



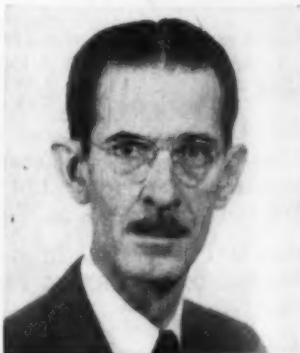
GILBERT SOLER, becomes assistant technical director, Universal-Cyclops Steel Corp., Bridgeville, Pa.



DAVID I. DILWORTH, JR., appointed assistant director of metallurgy, Crucible Steel Co. of America.

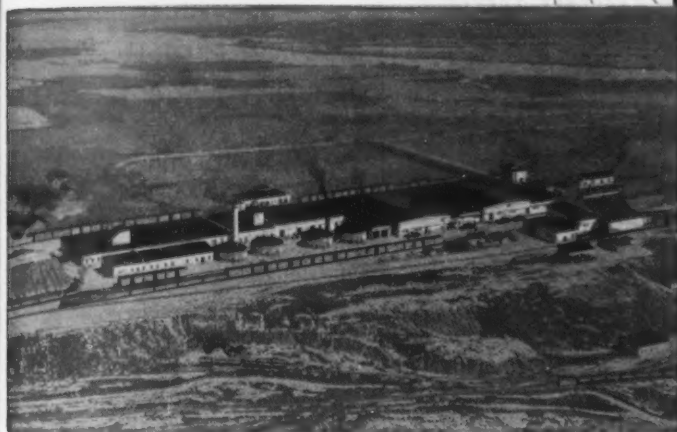
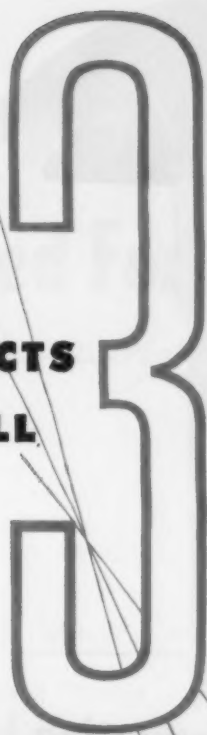


JOHN B. RUTHERFORD, named chief metallurgist, Tubular Products Div., The Babcock & Wilcox Co., Beaver Falls, Pa.



HAROLD D. NEWELL, appointed consulting metallurgist, Tubular Products Div., The Babcock & Wilcox Co., Beaver Falls, Pa.

# ILLINOIS CLAY PRODUCTS HAS ALL



## Central Location

The Illinois Clay Products Company, Goose Lake Plant, is located near Joliet, Illinois—only 55 miles from Chicago. Above is a map showing the excellent shipping facilities provided by the Elgin, Joliet & Eastern Railway—the Outer Belt Line.

## Ample Supply and Modern Plant

At Goose Lake, extensive deposits assure an ample source of fire clay for many years ahead. This large modern plant employs all the latest methods in the manufacture of refractories and insulation and many advanced and special techniques have enabled us to supply better products than are obtainable elsewhere.

## Chem-Brix

Pat. Applied for  
**CHEMICALLY BONDED  
REFRACTORIES**

## Quality Products

For over 40 years, Illinois Clay Products Company has maintained high standards in quality and uniformity. Research and development have led to constant improvements and new products such as Carbon and Hi-Silica Chem-Brix.

## THERM-O-FLAKE

**HIGH TEMPERATURE  
VERMICULITE INSULATION**

**GOOSE LAKE**

**FIRE CLAY BRICK  
AND CLAYS**



SINCE 1911

JOLIET, ILLINOIS





The above macrograph offers visual proof of the uniform grain flow characteristics in a carriage bolt made from Keystone "Special Processed" Cold Heading Wire. The continuous, strength-giving flow lines are a sure sign of efficient cold heading which results in longer die life, increased production and a better finished product.

The following analysis of "special processed" wire is recommended for difficult cold heading:

- C1006 - C1012 for Clutch Heads
- C1006 - C1022 for Phillips Heads
- C1108 - C1109 for Phillips Head Wood Screws
- C1035 - C1038 for Heat Treated Screws and Bolts

Keystone is prepared to help solve any of your industrial wire problems. Your inquiry is welcomed.

**INDUSTRIAL WIRE SPECIALISTS**

**Keystone Steel & Wire Company**  
PEORIA 7, ILLINOIS



## Personnel

*Continued*

Henry H. Hamilton, appointed assistant manager, Materials Handling Div., THE AMERICAN PULLEY CO., Philadelphia; Joseph C. Salette, Jr., named sales promotion and advertising manager; George L. Michel, becomes St. Louis district manager; Samuel S. Stuart, named Philadelphia district manager; and John J. McFarland, appointed Minneapolis district manager.

Robert L. Clark, named supervisor, Chemical Div. News Bureau, Pittsfield, Mass., GENERAL ELECTRIC CO.

Oscar E. Peterson, appointed district manager, Indianapolis district sales office, Dallas Div. (Chicago), REVERE COPPER & BRASS INC.

Robert J. Skarda, is now covering the New Jersey sales territory for the New York Branch of THE NATIONAL RADIATOR CO., Johnstown, Pa.

## OBITUARIES

Henry T. Ewald, 67, chairman of the board, Campbell-Ewald Co. in Grace Hospital, Detroit.

Walter L. Maxson, 60, vice-president Research, Oliver Iron Mining Div., U. S. Steel Corp., and a prominent leader in Taconite research recently in St. Josephs' Hospital in Billingham, Wash.

Arthur C. Bishop, 73, prominent Cleveland business leader, at his home in Clifton Park - Lakewood. He was a director of Oglebay, Norton & Co., Cleveland.

Frank M. Mason, 42, vice-president, U. S. Electrical Motors Inc., recently of a heart attack. He was general manager of the company's Atlantic plant in Cilford, Conn.

Charles H. Currier, 66, chairman of the board, Kewanee-Ross Corp., suddenly in Buffalo.

Raymond E. Gauthier, 43, district engineer, Fabricated Steel Construction Div., Alameda Fabricating Works, Bethlehem Pacific Coast Steel Corp., after a long illness.

Henry J. Sandblade, consulting engineer and vice-president. Thomas Flexible Coupling Co., Warren, Pa., of a heart attack while on a business trip in Climax, Colo.

George M. Gillen, 50, manager of marketing service, Market Development Dept., Lukens Steel Co., Coatesville, Pa.

# Modern Plating Equipment Is Designed For Any Shop

*Plating barrels and tanks*

## First of a series



By John E. Hyler  
Consultant  
John E. Hyler & Associates  
Peoria, Ill.

◆ Considerable savings are possible by the use of barrel plating equipment where bulk quantities of small pieces are handled. Many more such pieces can be processed in less time than with most other types of equipment. Barrel plating requires no racks and a smaller amount of anodes and electrolyte than does other equipment. The great deal of agitation and the burnishing effect obtained help the plating operation. However, barrel plating is not suitable where a mirror finish is desired.

Only exposed portions of a load are actually plated at any one instant. Therefore, the amount of electric current or the plating time required cannot be calculated. It is common practice to measure thickness of the deposit obtained after having run a charge in a barrel plater for a given length of time with standard current.

The charge in a plating barrel must be sufficiently small to be exposed to the current. Some kinds of parts tend to cling tightly together. Some even nest together and are obviously unsuitable for barrel plating. In general, it is seldom advisable to fill a barrel more than 40 pct full. Many times it is better to load it only 15 to 20 pct full. Sometimes parts with sharp corners or other delicate design may be damaged if

Proper selection and use of plating barrels and tanks enables efficient handling of small parts in large quantities at low cost. Available equipment can process as little as a 1-qt capacity per loading or millions of parts per day with a semi-automatic or full-automatic setup. Plating barrels eliminate racking of work and require less anodes and electrolyte. Their construction must be sturdy to give continuous trouble-free operation under the constant wear of moving parts. Plating barrels and tanks must also withstand the chemical corrosive action of various cleaning and plating solutions. Each piece of equipment is designed to give the best service and longest life in a particular set of plating conditions.

the barrel is rotated too fast. Such parts must be carefully loaded and the barrel must be revolved very slowly.

Various materials are used for making plating barrel cylinders and allied equipment. A material must withstand high temperatures, the chemical action involved and the wear which accompanies mechanical movement and friction. The material must not of itself be a conductor of electricity. Some plating barrels are made of Bakelite, Plexiglas, Melamine, or Lucoflex, depending upon the type and temperature of the electrolyte. Bakelite cylinders are excellent for use in acid solutions such as nickel and copper sulfate, and for alkaline solutions with low caustic content such as brass. They are also used for silver plating.

Plexiglas cylinders, equipped with cast iron gears and hangers, are used with cyanide solution. Where Plexiglas cylinders are to be carried through an entire cleaning, pickling, and plating cycle, or where acid solutions are used, the gears and hangers are usually covered with rubber.

Both Bakelite and Plexiglas cylinders are satis-

THE AUTHOR—Mr. Hyler brings to *The Iron Age* more than 20 years' experience in all phases of shop work. His studies and research have given him a broad practical knowledge of manufacturing problems.

**"One type of portable plating barrel processes workpieces through alkaline cleaning, water rinsing, acid treatment and plating..."**

factory for use wherever temperatures do not exceed 180°F. Melamine cylinders are satisfactory at temperatures from 200° to 210°F. This material resists abrasion and will stand up equally well in hot caustic solutions and low-concentration acid baths. Such cylinders can be used through hot cleaning, rinsing, acid dipping, and both cyanide and acid plating baths. They give excellent service in acid zinc, acid copper, nickel, cyanide copper, zinc, brass and all other plating solutions.

Lucoflex cylinders may be used within limits where temperatures are not too high. They have outstanding chemical and physical properties for withstanding alkaline and acid solutions where temperatures do not exceed 160°F. This material also has very good abrasion resistance.

Plating cylinders of hard rubber are preferred by some for use with cyanide. Many also prefer them for plating with cadmium, zinc and brass. Cylinders of Lucite can be subjected to temperatures as high as 180°F under 150-lb load. They provide long life and satisfactory performance under various conditions.

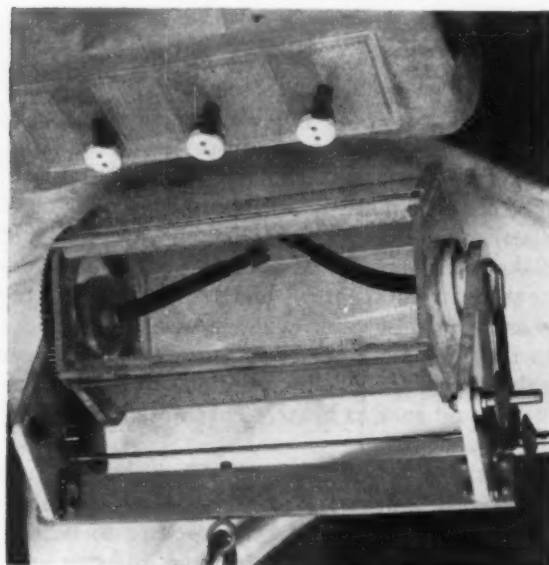
The introduction of du Pont high-temperature Lucite was an important advancement in electroplating. It has improved chemical and thermal properties over ordinary Lucite. This material is now widely used in general chemistry and electroplating. A structurally satisfactory bonding process in the form of a high-strength fusion weld has been developed to fabricate this mating process in the form of a high-strength fusion

range cells, transparent tanks, tank liners, cradles and baskets and can be machined, formed and welded to meet individual needs.

Welds in this material, as fabricated, are guaranteed by the manufacturer against faulty workmanship, against all acids or alkalis to 50 pct by volume concentrations, and against temperatures up to 228°F, for 6 months. Old and badly worn tanks can be provided with liners of this material, custom fabricated to fit. Cylinders can be made of the same material, or panels, doors, ribs and ends can be made for existing plating barrels. Where a complete changeover from old plating equipment is too costly, original plating cylinders can be replaced with cylinders of high-temperature Lucite and operating efficiency thereby increased. Plating cylinders of this type have sometimes been installed on obsolete equipment for which it was otherwise impossible to buy replacements.

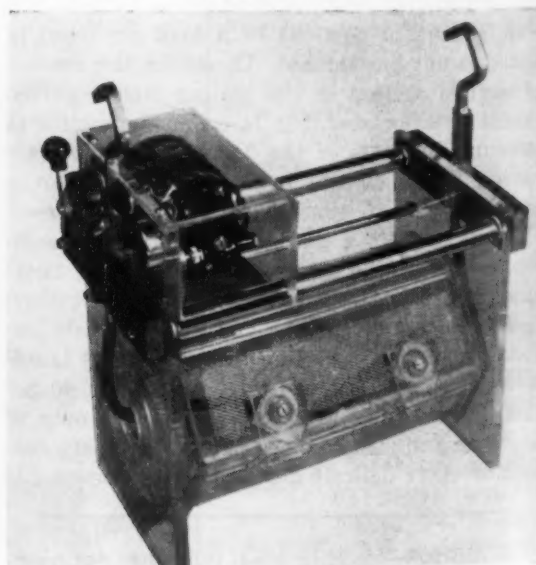
The standard diameter of perforations in horizontal plating barrels is 3/32 in. While the diameter and distance between perforations are provided according to customer preference, the recommendation for high-temperature Lucite is 1/8-in. drilled holes on 1/4-in. centers, using an equilateral-triangle pattern. This pattern produces 17½ pct more perforated area than any cylinder perforated on either the square or diamond pattern and may increase plating efficiency about 10 pct.

Portable barrel apparatus is often used where small quantities of work are plated. It gives ex-



**MODERN LUCITE CYLINDER** of one-piece construction has extra-heavy welded end pieces. Flexible dangle contacts transmit current efficiently to the work.

Courtesy: Belke Manufacturing Co.



**PORTABLE PLATING CYLINDER** equipped with overhead motor which provides continuous rotation and complete drainage.

Courtesy: Harwood Line Manufacturing Co.



cellent service where small pieces must be handled. One type of portable plating barrel is made of Lucite to provide for continuous processing of work pieces through the operations of alkaline cleaning, water rinsing, acid treatment, and plating.

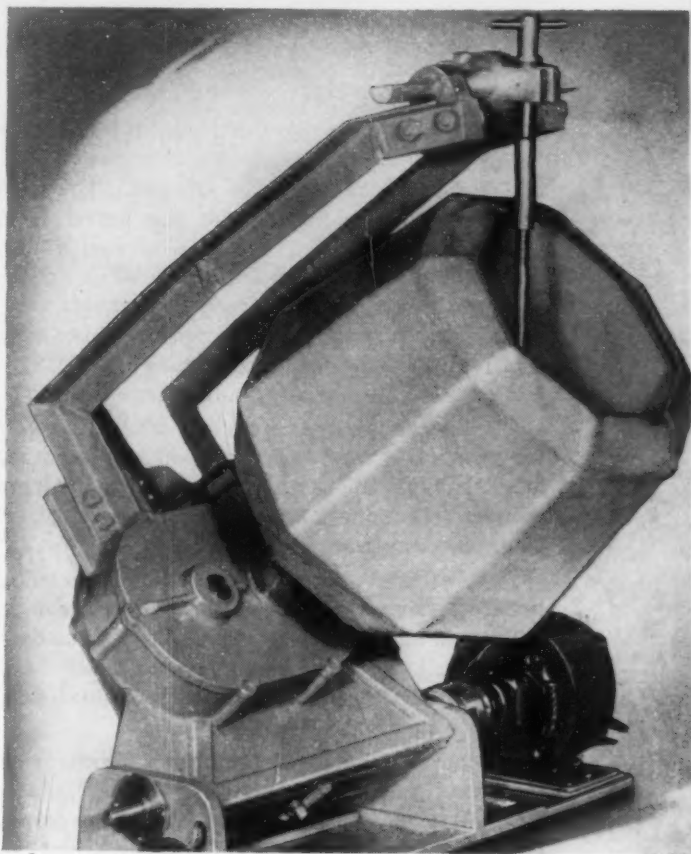
Horizontal plating barrel equipment is available in a single cylinder or in multiple cylinders. Multiple cleaning, plating and rinsing equipment of the barrel type is an important contribution to high-speed production plating. The number of cylinders in such a unit is limited only by the time required for plating and handling of work. Production is based on loading parts into a perforated cylinder, then transferring both cylinder and parts from one bath or operation to another. In this way, parts proceed through cleaning, pre-treating, plating and drying operations without being removed from the barrel.

Different methods are used to bring electric current to the work inside the cylinder. In one method, insulated copper cables or rods extend into the cylinder through hollow hubs at the cylinder ends. Flexible insulated cables with exposed contacts at the ends are connected to the cables or rods bringing current into the cylinder. These are called flexible dangle contacts. Another button-type arrangement has exposed contacts at intervals of about 6 in. along each longitudinal corner in the cylinder.

Some types of parts being plated need special contacts to obtain proper distribution of current. Specific requirements can be obtained from plating barrel manufacturers.

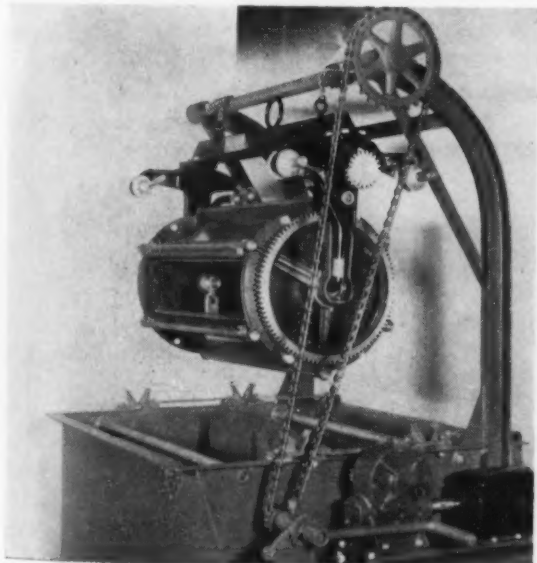
While button contacts, arranged on staves running along the internal and longitudinal angles of hexagonal plating barrels, are entirely satisfactory for various types of work, other

parts may require contacts extending further into the barrel. Some plating barrels are therefore fitted with cone, acorn, or pin-type contacts, spaced along the staves in like manner. Special insulated pin-type contacts are sometimes used.



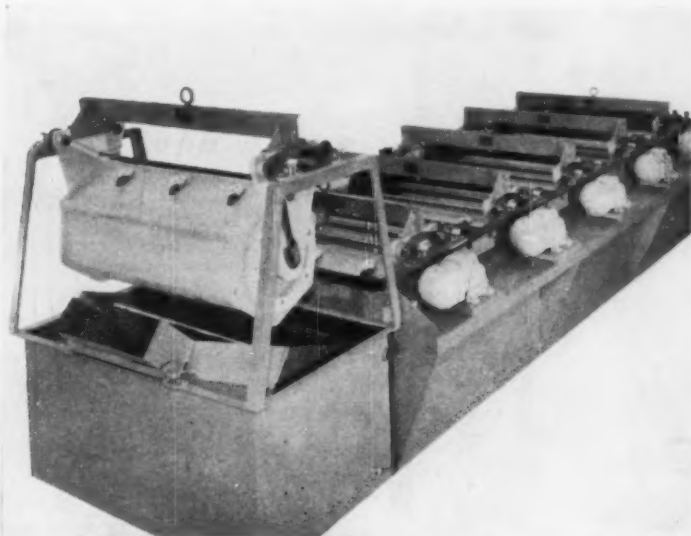
THIS OBLIQUE BARREL holds from 2 to 2½ gal solution and from 3 to 10 lb of work. The working angle of the barrel is adjustable. The cylinder has a ⅛-in. thick coating of rubber on the inside and outside.

Courtesy: Hanson-Van Winkle-Munning Co.



SINGLE-BARREL UNIT equipped with hand-type hoist is used where the volume of work is light. Such a hoist eliminates the need of a monorail.

Courtesy: Udyllite Corp.



FIVE-BARREL UNITS such as this are used for high-speed zinc plating and rinsing operations. This unit has a barrel stand and a perforated unloading hopper.

Courtesy: Belke Manufacturing Co.

**"One type of barrel can be hung  
in a tank and operated from a  
110-v receptacle . . ."**

Contacts vary with the particular type of work being handled. For many kinds of work, special rod contacts are more efficient. The rods extend longitudinally through the barrel from the cylinder head. A Lucite plug can be unscrewed from the barrel head to clean or replace the rods. Steel rods are used for cyanide solutions. Brass rods are recommended for acid solutions. Small-diameter cylinders have three rod contacts and large cylinders have four rods.

Flexible dangler contacts are highly popular for general barrel plating service. Another dangler type of contact incorporates hairpin dangles. Hairpin dangles are uniformly spaced along the length of an insulated shaft.

In other cases, special star contacts, extending inwardly from each hub of the barrel, are used with good success. There is also a special ball-and-chain type of dangler contact. Small balls dangle on chains from a rod which maintains an axial position in the barrel.

Hanger equipment for perforated barrels is an important factor in a plating layout. This is especially true when designing to allow deeper barrel immersion in the tank. Deeper barrel immersion speeds the plating process. Some cylinder units are equipped with angle-iron hangers. A pair of hanger pins at each end of the barrel

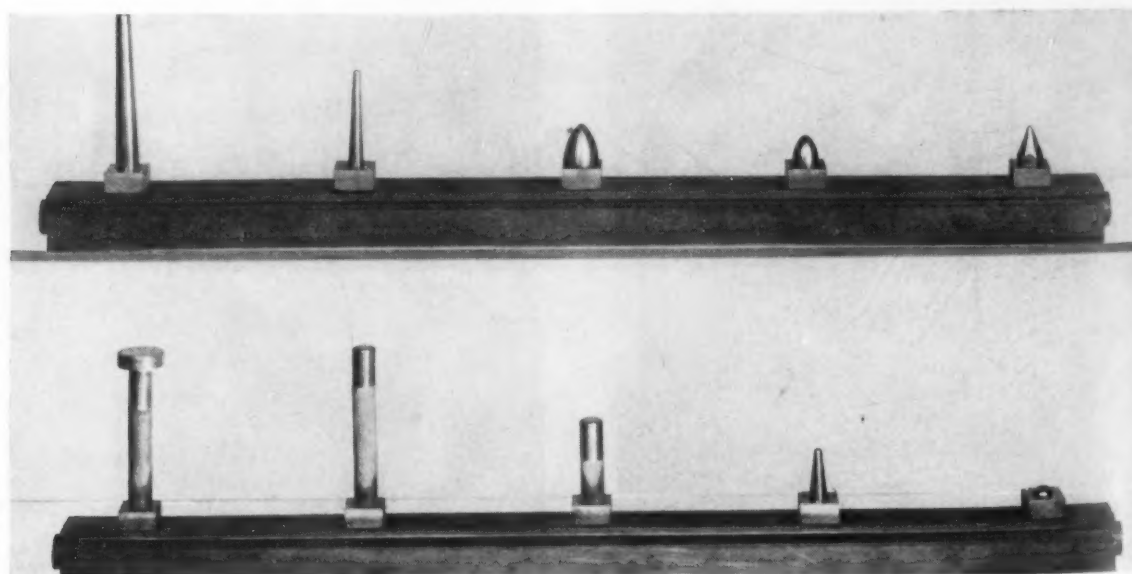
slip into special saddles at the top of the tank when the barrel is lowered. Almost complete barrel immersion is obtained. A special rotating device rotates and drains the cylinder over one tank before it is transferred to the next.

Many plating barrels are now provided with an overhead motor drive. It rotates the cylinder when it is out of the bath, thus reducing drag-out and contamination of the bath. No meshing of gears occurs as on tank side drives. Rocking of cylinders and arcing at the saddles are completely eliminated.

A special friction drive is advantageous from the standpoint of preventing all torque and twist in the cylinder, yet permitting heavy loads to be driven. Plating cylinders used with tanks housing submerged friction mechanisms have disk-type ends 1 in. thick. These ends are tired with iron and machined accurately to center points. In the lower part of the tank, two parallel shafts driven by chain from sprockets mounted on their ends carry four V-faced friction-drive pulleys. When the cylinder is lowered, it automatically goes into exact position and the edges of the disk-type ends settle into place in the pulleys. This mechanism is completely trouble-free.

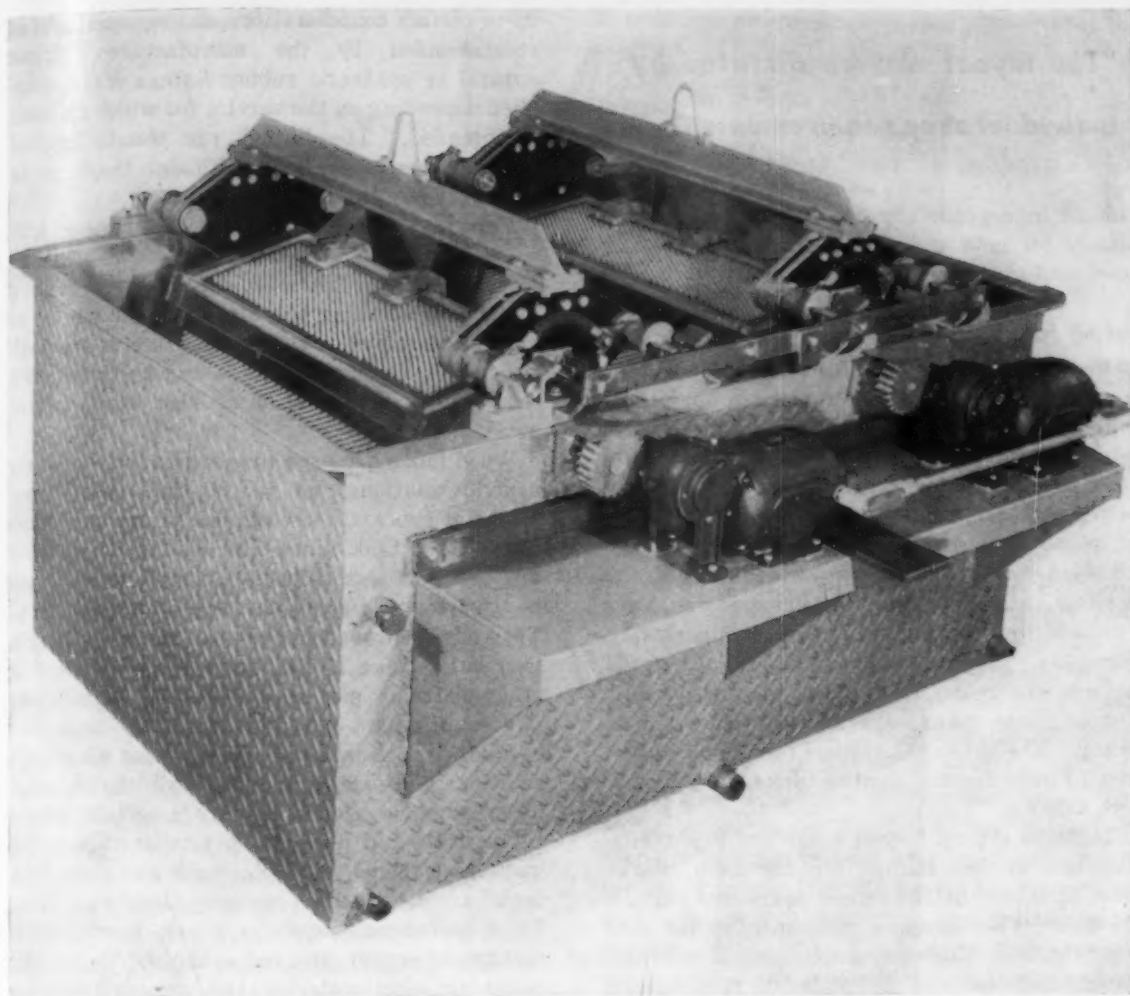
Another type of barrel can be hung in any existing still tank and operated from a standard 110-v receptacle. A motor is mounted directly on the barrel hanger frame. Because the barrel revolves as it is lifted from the solution, it provides better drainage and low drag-out loss.

Some plating barrel units are equipped with pumps. In such cases cylinders are provided with a hollow-drive trunnion. The centrifugal pump has a capacity ranging from 25 to 100 gal per min, depending upon the size of the installation. When the pump operates, solution is



BUTTON CONTACTS of various types distribute electric current through the work when the cylinder revolves.

Courtesy: Hanson-Van Winkle-Munning Co.



HIGHLY EFFICIENT double-barrel plating unit is driven by individual motors. Multiple-unit barrels are made with any desired number of cylinders to a tank.

Courtesy: Harwood Line Manufacturing Co.

drawn from the immersion tank through a perforated pipe near the tank bottom. It is pumped through the hollow trunnion into the cylinder. Instances have been cited where pumping equipment shortens cadmium plating time from 20 to 25 pct. Pumping of cyanide solutions results in a finer grade of plated work. An iron pump is needed for cyanide solutions. A Duriron pump or its equivalent is used for acid solutions.

Another type of plating barrel is the oblique type which is not perforated and holds both the electrolyte and the parts to be plated. Such barrels necessarily have the anodes placed inside of them. They can be tilted to any desired angle for rapid loading and unloading. These barrels are made in different sizes, selection of which is based on the type and amount of work to be handled. Non-perforated barrels are used where the workpieces are so small that they would tend to pass through a perforated barrel.

The work is usually dumped on a screen over the tank allowing the solution to drain back into the tank. Oblique barrels have the disadvantage that it is necessary to replenish the barrels with solution each time they are loaded with parts.

When using perforated barrels, handling of electrolyte is minimized.

While oblique plating barrels are usually of the non-perforated type, some are perforated. They revolve in a tilted position in a tank which holds the electrolyte. On a shaft on one side of the tank is held in bearings to allow it to oscillate as the barrel is lifted or lowered in the tank. The shaft extends beyond the end of the tank and has a counterbalanced side arm which enables the operator to raise or lower the barrel with ease.

Workpieces may be inspected at frequent intervals during the plating cycle. No hoisting equipment in the ordinary sense is necessary. The machine begins plating when the counterbalanced side arm is raised, allowing the cylinder to rest in its oblique plating position.

Cylinder plating apparatus of jewelers' type is used for very small quantity plating. It is either belt-driven or motor-driven. The standard cylinder on such units is made with Bakelite heads, staves and panels. Contact with the work is made through chain dangles. Cylinder capacity is approximately 1 qt of work. The tanks are



**"The layout will be dictated by individual shop requirements ..."**

made of high-grade vitrified stoneware which is suitable for gold and silver solutions as well as nickel and other plating baths.

**Plating tanks**

The many kinds of chemicals and the different temperatures used in electroplating operations make it necessary that tanks and linings be corrosion resistant under any specific circumstances. Tanks and linings are available in virtually any desired size and for every electroplating, cleaning, pickling, or rinsing treatment.

Welded steel tanks are widely used for cadmium, brass, cyanide copper and zinc solutions, and for cleaning baths and certain rinsing operations. Such tanks are made of high-grade steel and are welded from the inside and outside. Most of these tanks have a reinforcing rim at the top. The thickness of steel tanks may range from 10 gage for the smaller tanks to  $\frac{3}{8}$  in. for large tanks.

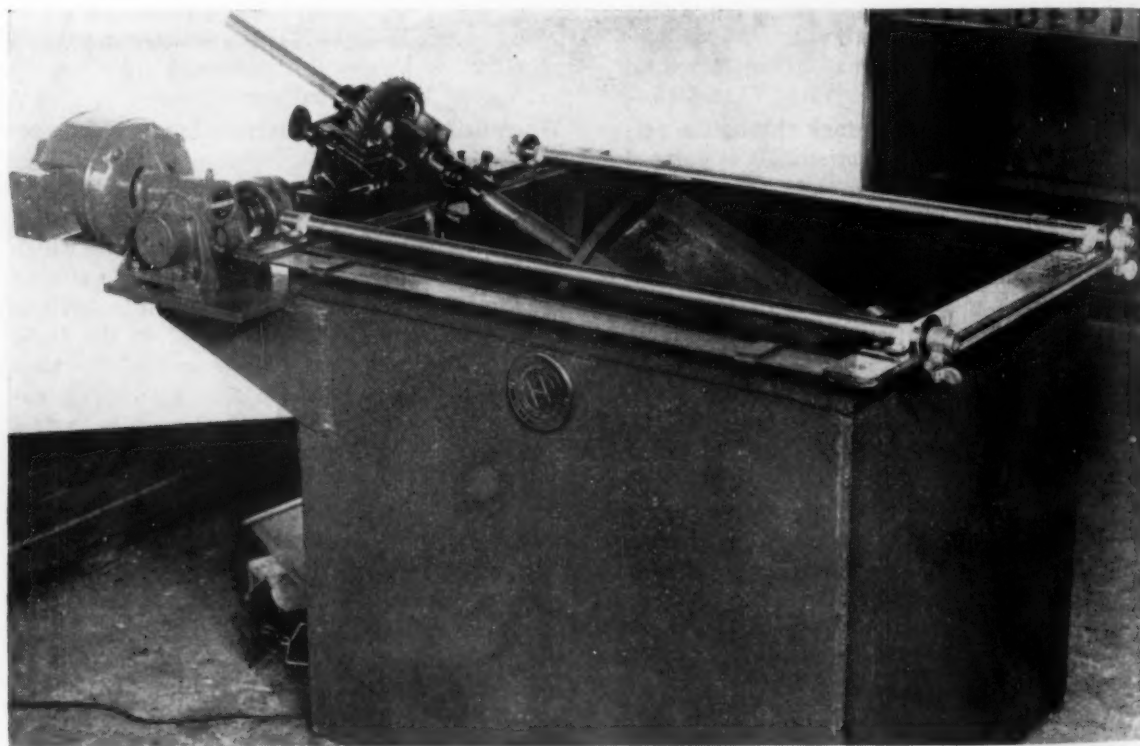
The same types of steel tanks are made with vulcanized rubber linings for use with bright nickel solutions, bright copper baths and certain acid dips. They are also recommended for acid copper baths. Muriatic, nitric, phosphoric and sulfuric acids can also be handled in such linings

up to certain concentrations and temperatures as recommended by the manufacturer. Either natural or synthetic rubber linings may be applied depending on the service for which the tank is intended. The linings are usually applied where the tanks are made although they may be applied where the tank is to be used.

Polyvinyl chloride linings are available in  $\frac{3}{32}$  and  $\frac{3}{16}$ -in. thicknesses for use with chromium plating baths or nitric acid solutions. With a nitric acid solution, the concentration can be as high as 10 pct when the temperature of the bath is  $140^{\circ}\text{F}$ . The concentration can be 20 pct at a temperature of  $120^{\circ}\text{F}$  or as high as 35 pct at  $90^{\circ}\text{F}$ .

Wood tanks are used to some extent for nearly neutral solutions and for hot and cold rinses. Tanks of cypress, redwood and fir are quite durable. Wood tanks lined with lead or a lead alloy are also used extensively. Asphalt linings may be used for cold solutions such as bright nickel. Tie rods for wood tanks are usually wrought iron but rods of Monel, brass, stainless steel or other materials may be obtained for certain service conditions.

Earthenware tanks can be used for all plating solutions and acid dips except hydrofluoric acid. They must be used with care especially where there are rapid changes in temperature which may crack them. Concrete tanks and glass-lined tanks are also used in some applications. Some firms make equipment for cobalt bright nickel and bright copper, and for anodizing, electrolytic polishing, electrocoloring and spray rinsing.



PERFORATED OBLIQUE BARRELS such as this are used for small workpieces in moderate quantities. This H-VW-M unit holds up to 25 lb. The cylinder is of Bakelite or Melamine and the steel tank is either rubber- or Koroseal-lined, depending on the solutions to be used.

Courtesy: Hanson-Van Winkle-Munning Co.

## Multi-Fixture Table Speeds Soldered Assemblies

♦ AN UNUSUAL MERRY-GO-ROUND multi-fixture table has speeded assembly of soldered dual carburetor floats at Rochester Products Div. of General Motors Corp., Rochester, N. Y.

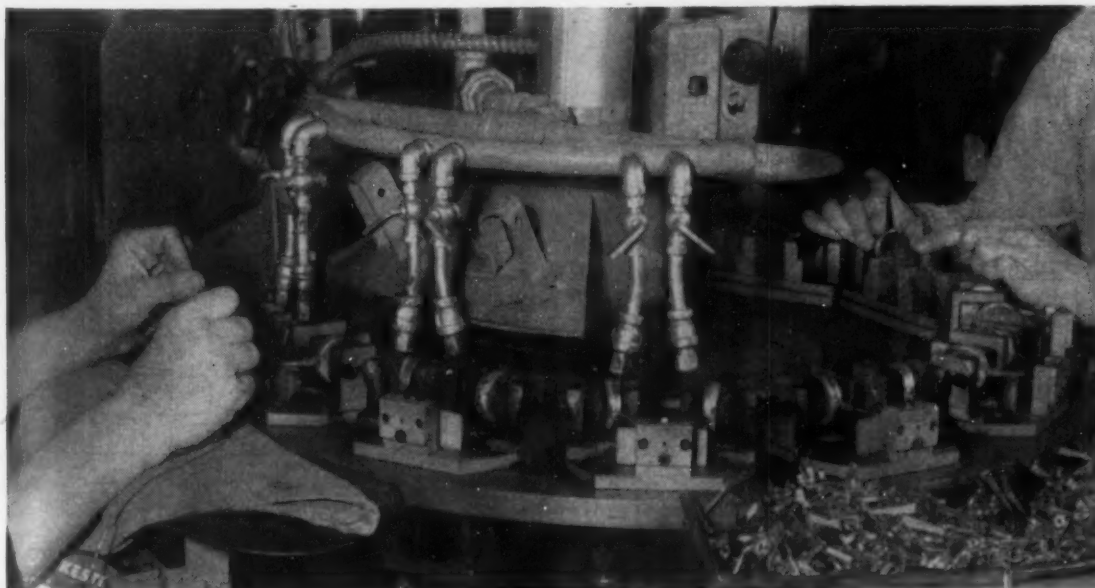
Each float assembly consists of two separate floats soldered to opposite ends of a brass yoke. Each float has two stamped halves that mate. These are soldered at a peripheral seam. Two of these pre-soldered floats are joined, one to each end of the yoke, in the soldering setup shown.

Soldering is done on a slowly rotating table having 12 fixtures. An operator places two floats and a yoke in each fixture as it passes the loading station. After passing the loading station, fixtures lock automatically and pass under three pairs of gas burners that direct flames on areas to be heated.

Two pairs of flames preheat the parts. Two

flames at the soldering station bring the metal and core solder used up to a temperature sufficient to melt the solder and cause it to flow between the ends of the yoke and the floats. At the soldering station, a second girl wearing gloves is seated. Below her forearms hang two spools of core solder that unwind as needed.

One piece of wire is held in each hand. Tips of the core wire are directed so they contact the joints to be made and are held there long enough for solder to run into the joints, after which the core wire is withdrawn. As the joints emerge from the flames, they cool and the solder freezes. By the time the soldered assembly approaches the loading station, it is cool and is automatically unlocked and removed. With this setup, two girls are able to produce over 500 assemblies an hour.



ROTATING TABLE holds 12 fixtures in which floats and yokes are loaded; right. Operator, left, touches core solder wires to parts preheated to soldering temperatures.

# Machinability Studies

## Compare Cast and Wrought Steels

The tendency to group all cast steels under one machinability heading prompted the Steel Founders' Society of America to undertake a comprehensive study on the machinability of cast steels. Seven diversified and widely used cast steels prepared in 18 different heat treatments for turning, were selected for study. Previously little had been done to determine the proper speeds and feeds for machining castings efficiently. One of the most interesting parts of the study is a comparison of the machinability of cast and wrought steels. Although only preliminary studies have been made, indications are that cast and wrought steels with similar microstructures have comparable machining characteristics when high speed steel tools are used. With carbides machinability of the two is comparable except at 300 fpm. Above 450 fpm cast shows superior machining properties.

♦ **LACK OF MACHINABILITY DATA** on cast steels prompted the Steel Founders' Society of America to undertake a research project along these lines last year. The need for such an effort is shown by the tendency to group all cast steels under one machinability heading. Until this study was made little had been done to develop methods for properly determining speeds and feeds to machine steel castings efficiently.

In this report, tool life is used as a means of determining machinability. Tool life characteristics of carbide and high speed steel tools together with a comparison of the machinability of cast and wrought steel are given. Tool life studies were made on seven diversified and widely used cast steels selected by the Society's Technical Research Committee under the direction of C. W. Briggs, technical and research director. These steels were prepared in 18 different heat treatments for turning. Work was done by Norman Zlatin, John F. Fahles, John Maranchik and W. H. Friedlander of Metcut Research Associates. The data contained in Fig. 1, on just one steel, is an indication of the large number of studies undertaken on the machinability of cast steels.

Since tool wear is a reflection of machinability, curves showing composite data on the machinability of cast steels are plotted on tool life v. cutting speed charts for both carbide and high speed tools. Tool life is expressed as the

amount of metal removed for a given tool wearland. Individual charts of tool life v. cutting speed for each of the steels together with their microstructure are also presented for those wanting more definite information. As cutting speed increases metal removal is lowered for a given tool wearland. A plot of cutting time in minutes v. cutting speed is included with each chart.

Conclusions drawn from these curves show

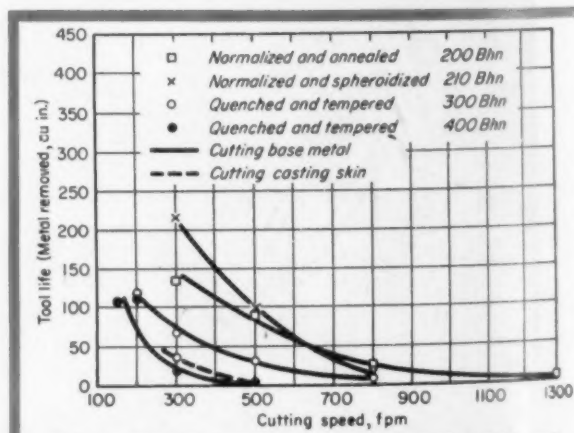


FIG. 1—Tool life v. cutting speed chart for 4340 cast steel using 78 B carbide blanks. Tool angles: BR 0°, SR 6°, SCEA 0°, ECEA 6°, Relief 6°. Nose radius 0.040 in., feed per rev 0.010 in., depth of cut 0.100 in.



that an increase of 100 to 200 pct in machinability can be obtained with proper heat treatment and that hardness alone cannot be a definite guide in predicting machining characteristics for turning. Plain carbon steels generally machine better than alloys for a given structure. With carbide tools plain carbon cast steels should be machined at 400 to 600 fpm. Recommended speeds for cutting alloys with carbides range from 200 to 400 fpm. Cutting speeds for both carbon and alloy when high speed tools are used range from 40 to 180 fpm. The machinability of 1040 cast steel when using carbide tools varies with the ratio of ferrite to pearlite in its microstructure. A 60/40 ratio gives the best machinability. The skin of cast steels should be machined at one half the recommended cutting speed for the base metal if equivalent tool life is to be obtained.

One of the most interesting parts of this study is the comparison between the machinability of cast and wrought steels. Previous Metcut research on machinability of wrought steels having microstructures similar to those of the cast steels being investigated permitted a preliminary comparison of the two. Machining characteristics of cast and wrought steels are shown in Figs. 2 to 6.

Although only single heats have been investigated and compared, indications are that cast and wrought steels with similar microstructures have comparable machining characteristics when high speed tools are used and a practical speed maintained. With carbides, machining results are roughly comparable except at 300 fpm. Better performance of wrought steels at this level indicates they are less abrasive. At higher speeds, however, abrasiveness is not as important in tool breakdown as the temperature developed at the tool interface.

A comparison of 4130 Cr-Mo cast steel and 4140 wrought steel in several forms of heat

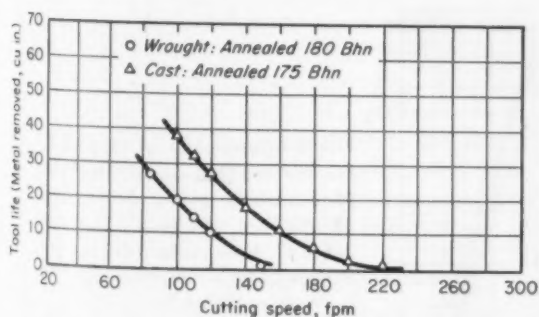


FIG. 2—Comparison of 4130 Cr-Mo cast and 4140 wrought steel using high speed tool. Tool angles: Br 0°, SR 15°, SCEA 0°, ECEA 5°, Relief 5°. Nose radius 0.005 in., feed per rev 0.010 in., depth of cut 0.062 in.

treatment is shown in Fig. 2. When using carbides, results show better machining results for wrought steel at 300 fpm. Above 450 fpm, however, the cast steels show superior machining characteristics. Use of high speed tools, as seen in Fig. 2, permits cast steel to be machined at a

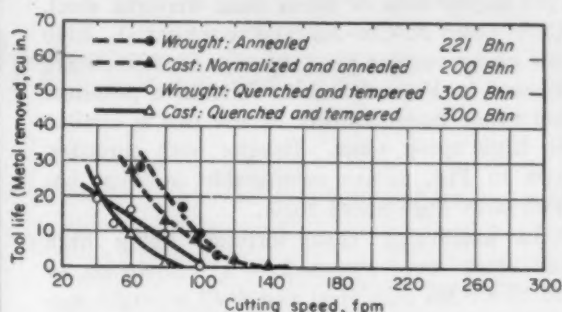


FIG. 3—Comparison of 4340 Ni-Cr-Mo cast and 4340 wrought steel using high speed steel tool. Tool angles: BR 0°, SR 15°, ECEA 5°, Relief 5°. Nose radius 0.005 in., feed per rev 0.010 in., depth of cut 0.062 in.

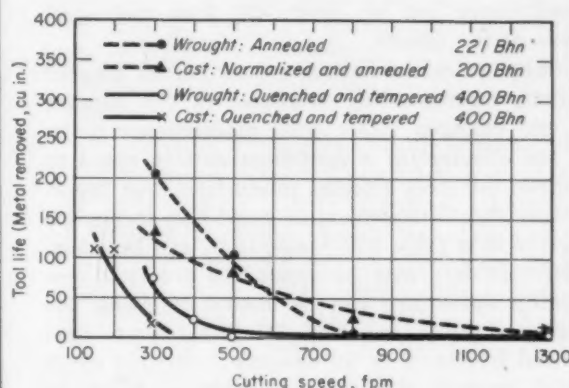


FIG. 4—Comparison of 4340 Ni-Cr-Mo cast and 4340 wrought steel using 78 B carbide blanks. Tool angles: BR 0°, SR 6°, SCEA 0°, ECEA 6°, Relief 6°. Nose radius 0.040 in., feed per rev 0.010 in., depth of cut 0.100 in. Wearland 0.015 in.

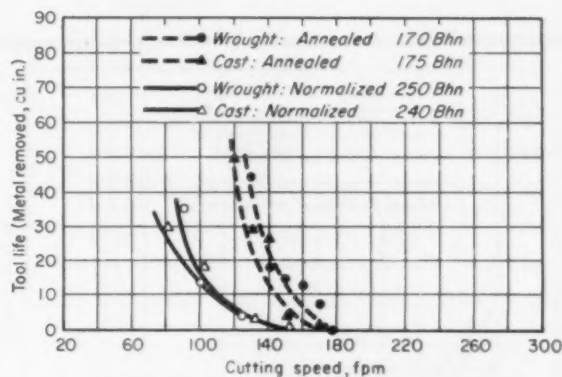


FIG. 5—Comparison of 8630 cast steel and 8640 wrought steel using high speed steel tool. Tool angles: BR 0°, Sr 15°, SCEA 0°, ECEA 5°, Relief 5°. Nose radius 0.005 in., feed per rev 0.010 in., depth of cut 0.062 in. Wearland 0.060 in.

**"Higher cutting speeds permit  
greater output . . . Tool changes  
raise maintenance costs . . ."**

40 pct higher rate of speed than wrought steel.

Cast 4340 Ni-Cro-Mo and wrought E 4340 steels under various heat treating conditions are compared in Figs. 3 and 4. Within a practical speed range machinability of the two is similar with high speed tools. Results with carbides, shown in Fig. 4, are comparable to those obtained with high speed tools.

Like machining characteristics using high speed steels were obtained in a comparison of 8630 Ni-Cr-Mo cast steel and 8640 wrought material in the annealed and normalized states, see Fig. 5. These curves indicate that a certain cast steel is equivalent to a higher carbon wrought steel if their hardnesses are similar. When machined with carbides, Fig. 6, wrought steels show better machining properties in the lower speed range but at about 425 fpm cast steel gives better results.

Although higher cutting speeds permit greater output, corresponding increases in the number of tool changes raises total maintenance costs. In the selection of a maximum cutting speed to achieve the most efficient production, tool life v. cutting speeds charts are of great help in providing the data from which selections can be made. How this data may be applied to practical machining operations can be shown by using the curve of 8630 annealed Ni-Cr-Mo cast steel plotted in Fig. 6 as an example. On this chart metal removal is given for 0.100-in. depth of cut and 0.010-in. feed. The wearland is 0.015 in.

If a turning operation requires a metal removal of 5 cu in. per piece, the metal removed at 300 sfpm equals 200 cu in. or permits the making of 40 pieces before tool wear reaches 0.015 in.

If the depth of cut is increased to 0.015 in., metal removal at the same speed is increased 50 pct and the pieces able to be machined before tool wear reaches 0.015-in. is 60.

At 500 sfpm, 100 cu in. will be removed with a 0.100-in. depth of cut. The number of pieces that can be machined is 20. If the depth of cut is increased to 0.015-in. the number of pieces machined at 500 sfpm is raised to 30.

An increase in wearland from 0.015 to 0.030 in. would raise the number of pieces per tool grind to 120 at 300 sfpm, and 60 at 500 sfpm.

Now the cutting time at 300 sfpm, see Fig. 6, equals 55 min for 60 pieces or 110 min for 120 pieces with a 0.030-in. wearland. Cutting therefore, is about 1 min per piece. If loading and unloading takes 0.5 min then the total time per piece is 1.5 min. For 120 pieces the total time would be 180 min. Tool changes would be required every 3 hr.

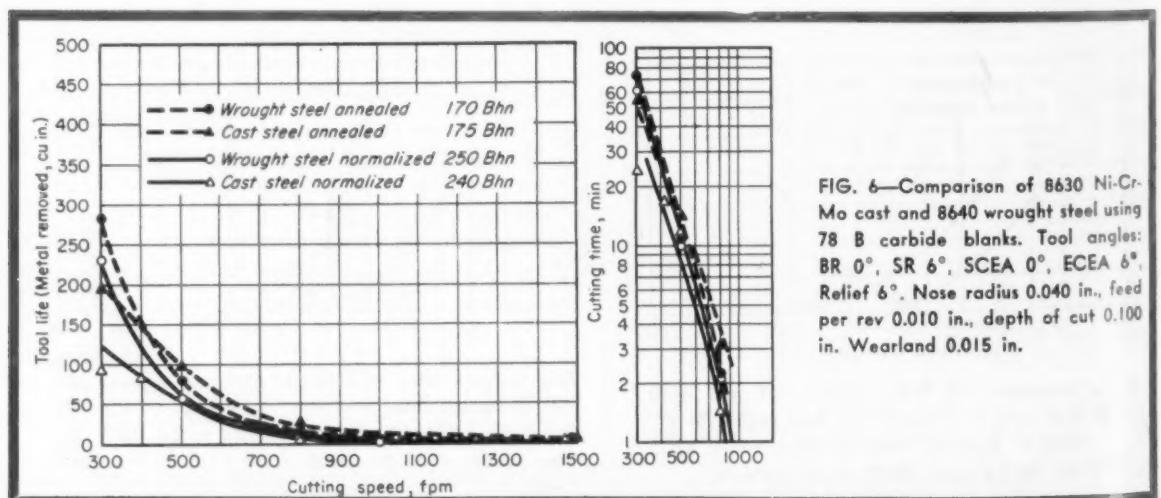
**Effect of wearland size**

Correspondingly, at 500 sfpm, 100 cu in. of steel would be removed in 15 min for 30 pieces as read from the cutting time chart in Fig. 6. With an increased wearland of 0.030 in., 60 pieces could be machined in 30 min before a tool change is needed. This means a machining time of 0.5 min per piece. If loading and unloading takes 0.5 min the total time per piece is 1 min. Sixty pieces can then be machined in 1 hr before a tool change is required.

Thus, at 300 and 500 sfpm, 120 pieces would be machined as follows:

Speed	Time (120 pieces)	Time Between Tool Changes
300	180 min	180 min (every 120 pieces)
500	120 min	60 min (every 60 pieces)

At the higher speed, the production rate is increased about 50 pct while tool changes occur three times more frequently. From this information the more economical of the two speeds can be chosen.



# Silicon Carbide

## Deoxidation Practice Grows

♦ **SILICON CARBIDE (SiC)**, commercially identified as Ferro Carbo S, Carbo-Sil and Electrocarb, is currently used in the steel industry as a deoxidizer, silicon source and flux for slags. Shortages of supply in deoxidizing aluminum and restrictions brought about by government controls focused attention on use of silicon carbide as a substitute for aluminum and part of the required silicon. The use of silicon carbide has a decided cost advantage over the former aluminum practice.

The current use is not new or novel. A series of United States patents were issued in 1885-1896 covering the same practices of today.

Republic Steel Corp. has set up a standard silicon carbide deoxidation practice for various grades of steel. On low-carbon rimmed steel, under 0.15 C, silicon carbide is added to the ladle of pound for pound substitution for aluminum. In semikilled steel of variable carbon content, silicon carbide has been substituted for 50 pct ferrosilicon additions in the ladle. Approximately 4 to 5 lb per ton are added to meet a specification of 0.05 to 0.07 Si.

On killed, plain carbon grades, work has been done to substitute 2 lb per ton of silicon carbide

for an equivalent silicon weight in 50 pct ferrosilicon. On a 200-ton heat, 450 lb of silicon carbide would be equivalent to a 650-lb addition of ferrosilicon alloy. The carbon contained in the silicon carbide does not appear to have any appreciable practical effect on the final carbon content in the steel.

In the electric furnace, the use of special grades of silicon carbide as a slag conditioner shows promise. The work done to control austenitic grain size for better uniformity holds little promise. Experiments on the utilization of silicon carbide as mold additions to rimmed, capped and semiskilled grades have not shown favorable results.

As received the silicon carbide is packaged in four-ply paper bags of 25 or 50 lb each. Size of the grain, which is very important, varies from 8 mesh to 40 mesh. The coarser sizes are used for furnace additions and the finer sizes for ladle additions. Some of the silicon carbide now sold as a deoxidizer is recovered from the standard carbide grinding wheels. The wheels are crushed, the bonding agent is discarded and the silicon carbide is screened, sized and packaged for shipment.

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## NEW BOOKS

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*"Advanced Mechanics of Materials,"* by Fred B. Seely and James O. Smith. Second Edition. A comprehensive presentation, for students and engineers doing advanced work in the field. The book is divided in four parts: (1) Discussion of fundamental concepts; (2) Special topics on the strength and stiffness of members subjected to static loads; (3) Localized stress and stress concentration; (4) Energy methods. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. \$8.50. 680 p.

*"Mechanics and Physics of Solids."* First issue, first volume of the new Journal of Mechanics and Physics of Solids. Articles contributed by well known engineers. Sample: Plastic Instability Under Plane Stress. Pergamon Press, Ltd., 2 Studio Place, Kinnerton St., London S.W. 1. Subscription, \$12.60.

*"International Tin Study Group 1952 Statistical Year Book."* Contains general articles on what has been happening in recent years in the world tin and tinplate industries. Second part of the book is devoted to a detailed statistical presentation of the tin, tinplate and canning position the world over. The International Tin Study Group, 7 Carel van Bylandtlaan, The Hague, Holland. \$5.60. 268 p.

*"Metal Finishing Guidebook and Directory, 1953."* A comprehensive directory on the metalfinishing industry. Some of the more important sections: Mechanical and chemical preparation; plating solutions and operating data; special plating procedures; control, analysis and testing. Finishing Publications, Inc., 381 Broadway, Westwood, N. J. \$3.00. 556 p.



# Deformation by Transformation MAKES ALLOYS TOUGHER



By E. S. Machlin

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Columbia University  
New York

Deformation by cold working or applying stress increases the mechanical properties of most malleable metals. Thus deformation occurs either by slip or twinning or both. All metals have limits to this type of deformation. By applying the strain through phase transformation more deformation can be accomplished in shorter time. By using the latter method decreased notch sensitivity and increased impact resistance are possible.

♦ **DEFORMATION OF METALS** is usually accomplished by either slip or twinning. Much work has been done to ascertain the characteristics of these types of deformation chiefly because our industrial requirements provided the incentive to find means of controlling the strength and ductility of alloys. The same incentive exists to determine the characteristics of still another mode

of deformation—deformation by transformation. In this case, the incentive stems from a special need to find materials which have greater deformability and greater resistance to impact at low temperatures than our present engineering materials. A major characteristic of deformation by transformation is decreasing formability with decreasing temperature.

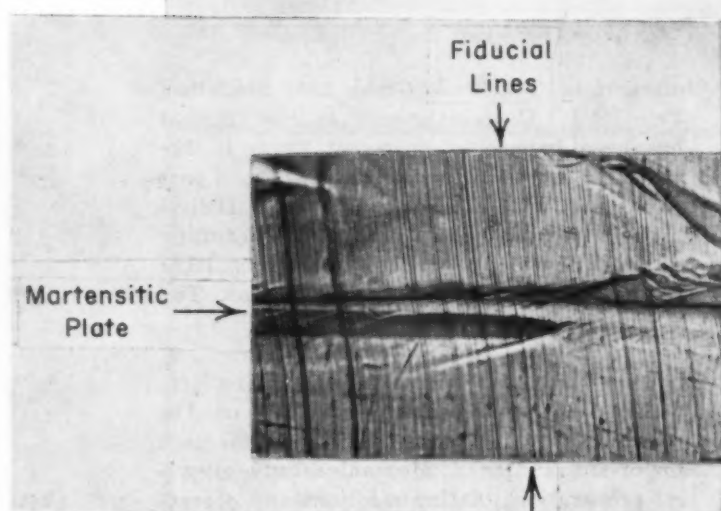


FIG. 1—Demonstration of deformation by transformation in a 70 pct Fe, 30 pct Ni alloy. The vertical fiducial lines have been displaced by the transformation in the transformed region. 250X

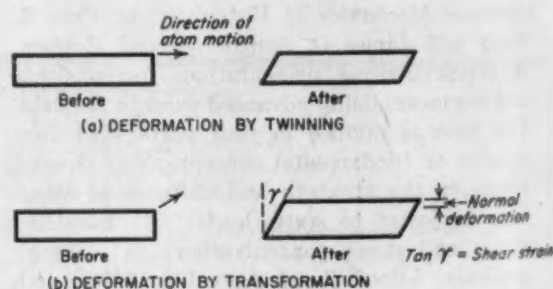


FIG. 2—Comparison of twinning and transformation deformations. No normal strain is involved in twinning. Usually a normal strain is involved in transformation.

Metastable austenitic steels, for example, can be partially transformed via a martensitic reaction by application of stress. Whenever this is done it is found that the transforming regions strain in such a way during their formation to change the length of the specimen in the direction of the applied force. The change in length can be accomplished without slip or twinning of the matrix, so that the specimen is deformed solely by the transformation induced by the applied stress.

Technically, two types of deformation by transformation can occur. First, the deformation is one step removed from a twinning strain in the direction of increasing complexity. A comparison of a twinning strain and such a transformation strain is made in Fig. 2. An illustration of the transformation strain is shown in Fig. 1. In the second case which occurs in face centered cubic structures the deformation can be described as a "partial" slip. The direction of "slip" is  $11\bar{2}$  instead of  $110$ . The net result of this "partial" slip is to yield a hexagonal close-packed structure one-atom-layer thick. This structure is termed a stacking fault in the parent phase.

In the first case, the total tensile deformation corresponding to complete transformation of austenitic steels under stress is about 12 pct. In the latter case there is no theoretical limit to the amount of deformation possible. Both modes of deformation have been well established. However, little work has been performed to determine the characteristics of these deformation processes. The potential utility of deformation by transformation suggests that research in this field may pay practical dividends.

As opposed to the slip and twinning deformation processes, the critical stress to induce deformation by transformation decreases with decreasing temperature, as illustrated diagrammatically

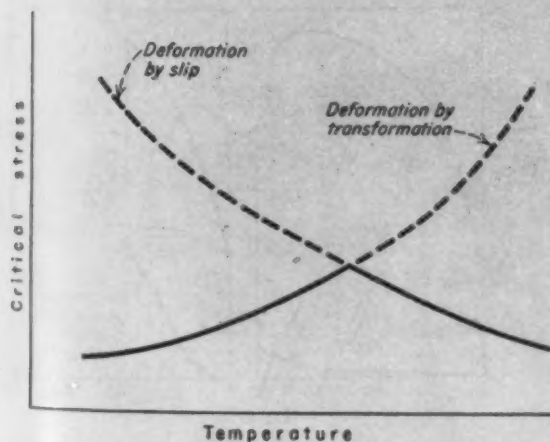


FIG. 3—Critical stress for deformation by slip v transformation.



FIG. 6—Illustrating the transformation products in a cold-worked stainless steel,<sup>2</sup> 2500X

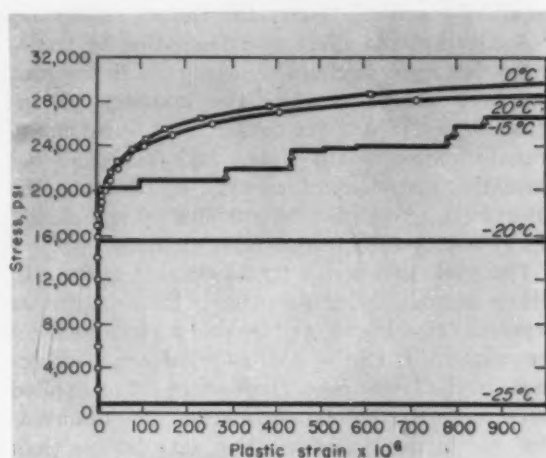


FIG. 5—Stress-strain curves for a 20 pct Ni, 0.5 pct C alloy, effect of temperature on yield stress.<sup>2</sup>

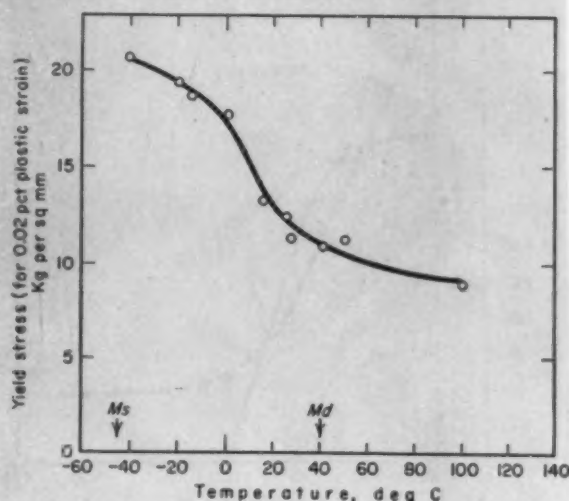


FIG. 4—Yield stress at 0.02 pct strain in a 71 pct Fe, 29 pct Ni alloy.<sup>2</sup>

in Fig. 3. With decreasing temperature it becomes easier to initiate deformation in a material that can deform by transformation. This characteristic is related to the notch sensitivity and impact resistance properties of alloys. Decreased notch sensitivity and increased impact resistance can be expected for alloys that deform via transformation.

Another characteristic of the deformation by transformation process is the speed with which it occurs. It has been reported that the deformation will proceed with about one-third the speed of sound. Slip proceeds at a much slower rate. Its progress can be followed with a motion picture camera taking 3000 frames per second. The frame speed required to follow deformation by transformation would be about 10,000,000—100,000,000 frames per second! The important result of this high speed of deformation is that deformation can occur fast enough to keep the stress at a concentration from building up to the fracture level. This characteristic also should lead to low notch sensitivity and relatively high impact resistance.

Analysis of the effect of deformation by transformation upon mechanical properties in the past has been complicated by the inability to unscramble the effects due to slip from those due to transformation. Many times, both modes of deformation occur simultaneously. In this case, the interaction effect may be complicated and should not be ascribed to transformation alone.

The yield stress for transformable alloys can either decrease with decreasing temperature as expected from Fig. 3, or increase with decreasing temperature if slip as well as transformation occurs. In the latter case, the first effect of applied stress is to induce transformation. The deformation due to the transformation may be less than the amount required to measure a yield stress in terms of some given plastic strain.

**"Deformation by transformation will proceed with about one third the speed of sound."**

The induced transformation, if harder than the parent phase, provides barriers to slip and raises the measureable yield stress. This situation leads to a yield stress that increases at a more than normal rate with decreasing temperature. Fig. 4 illustrates this behavior in a metastable austenitic iron-nickel alloy. The applied stress first starts to induce transformation at the temperature  $M_s$ . At this same temperature the yield stress starts its marked increase with decreasing temperature of test.

If no slip occurs and deformation corresponds wholly to transformation, then the behavior should be that illustrated in Fig. 3. This behavior occurs in a 20 pct Ni, 0.5 pct C steel as illustrated in Fig. 5. In this case transformation is first induced at  $-15^\circ\text{C}$ . Above this temperature, the yield stress has its normal increase with decreasing temperature due to slip behavior. Below this temperature, the yield stress markedly decreases with decreasing temperature due to transformation deformation.

The effect of simultaneous transformation deformation and slip on the other mechanical properties may be quite complicated. A guide of the expected effects is given in the box.

Whenever the transformation products are harder than the matrix, their formation should lead to, (1) an increase of the uniform elongation (strain hardening exponent) and the ultimate tensile strength, and (2) a potential decrease in

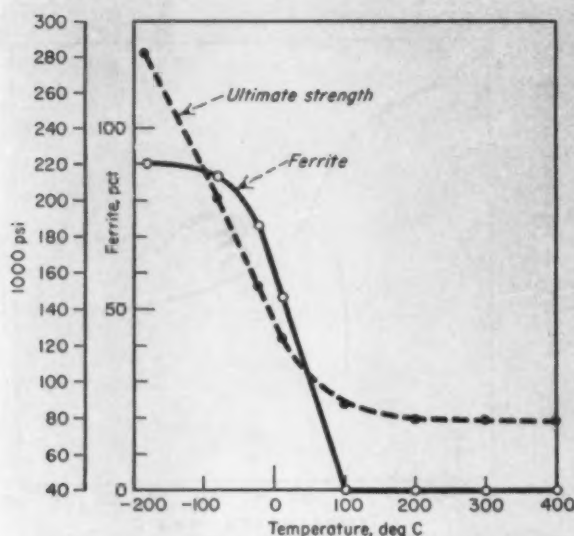


FIG. 7—Dependence of ultimate tensile strength in stainless steel upon the amount of ferrite.<sup>4</sup>

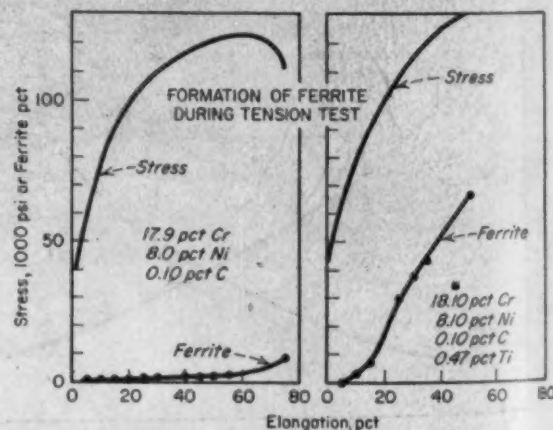


FIG. 8—Illustrating the effect of amount of ferrite formation during cold working of stainless steels on the uniform elongation.<sup>4</sup>



## STRESS-STRAIN CHARACTERISTICS

Characteristics	Factors to Consider
Yield Stress	(a) Critical Stress for Slip versus Transformation (b) Grain Size
Strain Hardening Exponent (uniform elongation) Ultimate Tensile Strength	(a) Hardness of Transformation Product (b) Amount of Transformation Strain (c) Mode of Distribution of Transformation product (d) Grain Size
Fracture Stress Reduction in Area	(a) Fracture Stress of Product (b) Additional Stress Concentrators and as above

the fracture stress due to the formation of stress concentrators.

In stainless steels, the transformed products

are distributed to minimize the formation of stress concentrators, see Fig. 6. Increasing the amount of transformation in this alloy should lead to an increase of the ultimate tensile strength and the uniform elongation. Fig. 7 illustrates the first relation and Fig. 8 the latter relation.

Whenever the transformation product is softer than the matrix and most of the deformation is due to transformation, a low uniform elongation and ultimate tensile strength can be expected. This result is illustrated in Fig. 9 which shows a stress-strain curve for a metastable beta-titanium alloy.

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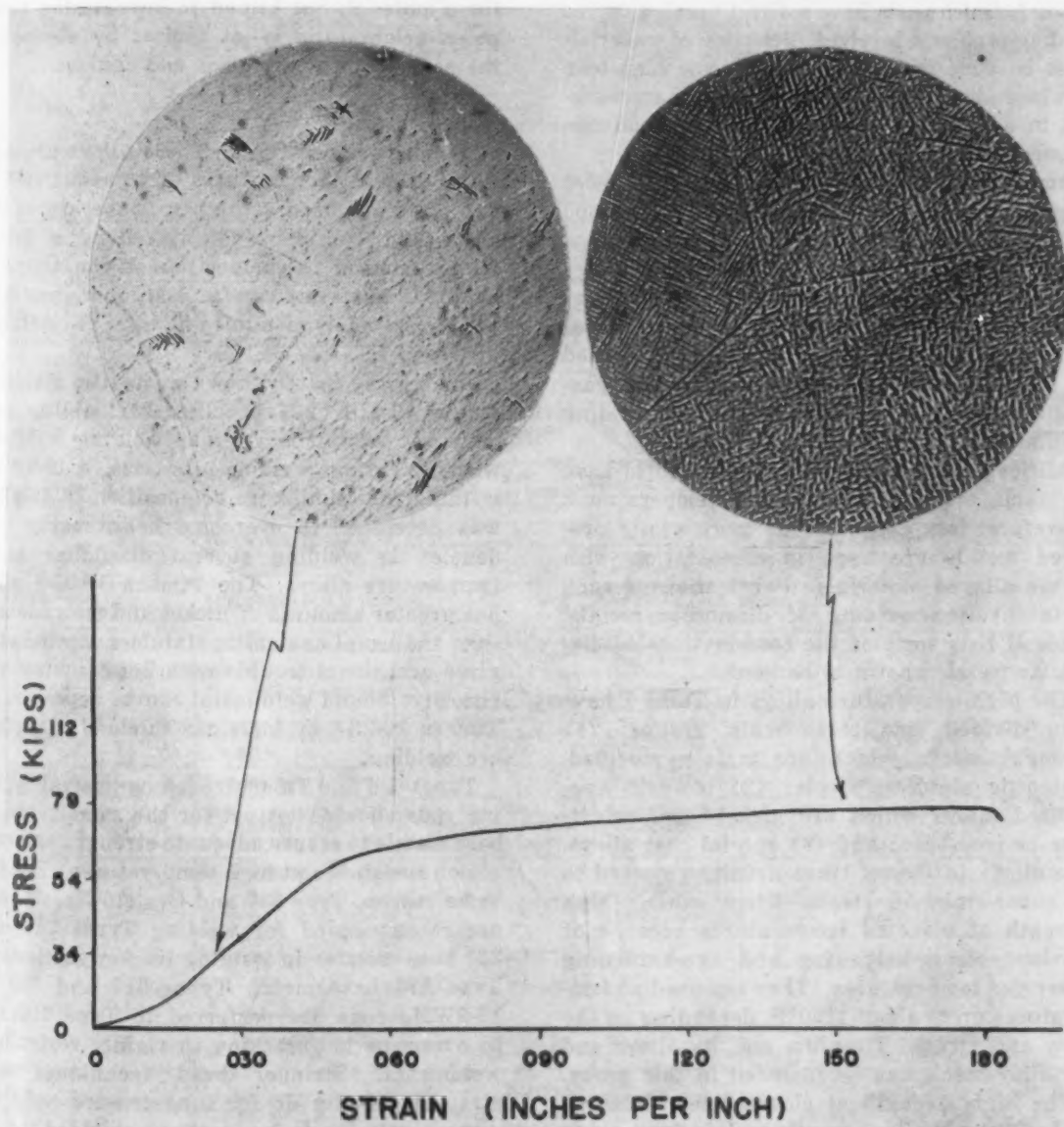


FIG. 9—Stress-strain curve for a stabilized 0.9 pct of Mo, titanium alloy. Test was conducted at room temperature. The strain was 0.12 in. per in. per min.



## WELDED JET ENGINE PARTS

### Cut Weight, Increase Power

♦ **FUNCTIONAL DESIGN OF JET ENGINE** parts is closely related to the properties of the metals at high temperatures. The materials selected for such parts have a direct bearing on the welding problems involved. Selection of materials must be done carefully because some high-temperature alloys have better welding characteristics in addition to equivalent physical and mechanical properties.

Among the materials used extensively for jet engine parts are the stainless steels in the 300 series. Other alloys with more specialized properties were developed of necessity for better corrosion resistance and greater strength at the higher temperatures. Some of the principal high-temperature alloys which can be welded by inert gas-shielded tungsten-arc, inert gas-shielded metal-arc and submerged arc welding are listed in Table I.

All jet engine parts are not required to have the same strength at elevated temperatures. Therefore, less expensive or more easily procured metals are used in combination with highly alloyed materials. Fabrication of such parts involves welding of dissimilar metals. Table II lists some of the combinations of dissimilar metals known to be used.

The high-temperature alloys in Table I have been divided into three main groups: (1) Wrought alloys which are mainly modified austenitic stainless steels; (2) wrought specialized alloys which are nickel-base, cobalt-base or iron-base; and (3) special cast alloys. The alloys in Group 1 are usually referred to as super-stainless steels. They exhibit high strength at elevated temperatures because of previous strain-hardening and age-hardening at service temperatures. They are used at temperatures up to about 1100°F, depending on the alloy and stress. Titanium and its alloys and low-alloy steels can be included in this group.

The high strength at elevated temperatures of the Group II alloys results mainly from aging

at service temperatures. These alloys are normally used at temperatures up to about 1400°F but some are used at higher temperatures for short-time loading. The cast alloys in Group III are similar in composition to the alloys in Group II but some can be used at higher temperatures. Molybdenum can also be included in Group III.

Among the better known austenitic stainless steels, 19-9DL has excellent weldability and does not exhibit any great welding difficulty with the various welding processes. A 19-9WMo welding rod, similar in composition to 19-9DL, was developed to overcome hot-cracking tendencies in welding several dissimilar high-temperature alloys. The Timken 16-25-6 alloy has greater amounts of nickel and molybdenum than the usual austenitic stainless steels but it gives occasional trouble with hot-cracking and porosity. Sound weld metal can be deposited on Timken 16-25-6 by inert gas-shielded tungsten-arc welding.

Types 316 and 318 molybdenum-bearing welding rods should be used for the same types of base metals to assure adequate strength and corrosion resistance at high temperatures. For the same reason, Type 347 and Oxweld No. 60 rods are recommended for welding Types 347 and 321 base metals. In welding thicker sections of Type 310 base metal, Types 312 and 309 or 19-9WMo rods are preferred to Type 310 rod to overcome hot-cracking in rigidly restrained weldments. Stringer bead techniques and straight polarity dc for tungsten-arc welding, reverse polarity dc for inert gas-shielded metal-

This article is an abstract of a paper, "Shielded Arc Welding of Jet Engine Components", presented at Thirty-third Annual Meeting of the AWS in Philadelphia by K. H. Koopman of Linde Air Products Co.



TABLE I

## PRINCIPAL HIGH-TEMPERATURE ALLOYS USED FOR JET ENGINE COMPONENTS

## Group 1—Wrought Modified Austenitic Stainless Steels

Alloy	Nominal Composition, pct	AMS Number	Jet Engine Component*	Welding Rod Recommended
19-9DL	19.00 Cr, 9.00 Ni, 1.00 Mo, 1.00 W, 0.4 Cb, 0.2 Ti, bal. Fe	5526B	Turbine wheels	19-9DL, Types 309, 310, 312, 316, 318
Timken 16-25-8	16.00 Cr, 25.00 Ni, 6.00 Mo, bal. Fe	5725 5727	Turbine wheels	Timken 16-25-8, Types 312, 316, 318, 309, 310, 19-9, WMo, Oxweld 60, Oxweld 61
Discaloy	13.00 Cr, 25.00 Ni, 3.00 Mo, 1.5 Ti, bal. Fe		Turbine wheels	Timken 16-25-8, Discaloy
Type 316	18.00 Cr, 12.00 Ni, 2.5 Mo, bal. Fe	5360	Turbine casings, exhaust cones, after burners, transition ducts	Type 316 or 318
Type 318	18.00 Cr, 12.00 Ni, 2.5 Mo, 1.00 Cb, bal. Fe		Turbine casings, exhaust cones, after burners, transition ducts	Type 318
Type 347	19.00 Cr, 9.00 Ni, 1.00 Cb, bal. Fe	5362A	Turbine casings, exhaust cones, after burners, transition ducts	Type 347 or 321
Type 321	19.00 Cr, 9.00 Ni, 0.5 Ti, bal. Fe	5510D	Turbine casings, exhaust cones, after burners, transition ducts	Type 321 or 347
Type 310	25.00 Cr, 20.00 Ni, bal. Fe	5366	Turbine casings, exhaust cones, after burners, transition ducts	Type 312, 309, 19-9 WMo or 310
Type 304 (extra low C)	18.00 Cr, 8.00 Ni, extra low C	5511	Turbine casings	Type 304 (extra low C), Oxweld No. 61, 347
Type 330	15.00 Cr, 35.00 Ni, bal. Fe		Combustion chambers	Type 309
25-20-2	25.00 Cr, 20.00 Ni, 2.00 Mo, bal. Fe		Combustion chambers, exhaust cones	25-20-2, Type 310, 316, 318

## Group 2—Wrought Specialized Alloys

Multimet (low C) or N-155	20.00 Cr, 20.00 Ni, 20.00 Co, 3.00 Mo, 2.50 W, 1.00 Cb, bal. Fe	5532B	Nozzle blades, after burners, exhaust cones, combustion chambers, nozzle diaphragm assembly	Multimet (low C)
S-590	20.00 Cr, 20.00 Ni, 20.00 Co, 4.00 Mo, 4.00 W, 4.00 Cb, bal. Fe	5533A	Nozzle blades, after burners, exhaust cones, combustion chambers, nozzle diaphragm assembly	S-590, Multimetal
Refractalloy B	25.00 Cr, 30.00 Ni, 8.00 Mo, bal. Fe		Combustion chambers, turbine wheels, exhaust cones	Refractalloy B
Refractalloy 26	18.00 Cr, 37.00 Ni, 20.00 Co, 3.00 Mo, 3.00 Ti, bal. Fe	5760	Turbine wheels	Refractalloy 26
Stellite 33 or Refractalloy 80	20.00 Cr, 20.00 Ni, 29.00 Co, 5.00 W, 10.00 Mo, bal. Fe		Nozzle blades	
Inconel X	15.00 Cr, 1.00 Cb, 2.50 Ti, 0.70 Al, bal. Ni	5542B (sheet) 5667B (bars and forgings) 5668B (bars and forgings heat treated)	Combustion chambers, nozzle diaphragm assemblies, exhaust cones, after burners	Hastelloy W, Inconel, Inconel X, Inconel W
Inconel W	18.00 Cr, 2.50 Ti, 0.70 Al, bal. Ni		Combustion chambers, nozzle diaphragm assemblies, exhaust cones, after burners	Hastelloy W, Inconel X, Inconel W
Nimonic 75	20.00 Cr, 0.30 Al, 0.40 Ti, bal. Ni		Combustion liners, exhaust cones, after burners	Hastelloy W, Nichrome V, Nimonic 75, Inconel
Nimonic 80	20.00 Cr, 1.00 Al, 2.30 Ti, bal. Ni		Combustion liners, exhaust cones, after burners	Nimonic 80
Hastelloy B	28.00 Mo, 5.00 Fe, bal. Ni	5752 (bars and forgings)	After burners	Hastelloy W
Hastelloy C	15.00 Cr, 17.00 Mo, 4.00 W, 5.00 Fe, bal. Ni	5530A	After burners	Hastelloy W
Hastelloy W	23.00 Mo, 5.00 Fe, 5.00 Cr, bal. Ni		After burners	Hastelloy W
S-816	20.00 Cr, 20.00 Ni, 4.00 Mo, 4.00 W, 4.00 Cb, bal. Co	5765A (bars and forgings) 5534A (sheet)	Turbine buckets Exhaust cones, after burners	S-816
Stellite 21 or Vitallium	27.00 Cr, 3.00 Ni, 5.00 Mo, bal. Co		Combustion chambers, nozzle blades, exhaust cones	Stellite 21
Stellite 25	20.00 Cr, 10.00 Ni, 15.00 W, bal. Co		After burners exhaust cones	Stellite 25

## Group 3—Cast Special Alloys

Alloy	Nominal Composition, pct	AMS Number	Jet Engine Component*	Welding Rod Recommended
Multimet (medium C)	20.00 Cr, 20.00 Ni, 20.00 Co, 2.00 W, 3.00 Mo, 1.00 Cb, bal. Fe	5767 (precipitation treated) 5768 (precipitation and solution treated)	Turbine buckets	Multimet (low C)

Turn Page



TABLE I—Continued

Alloy	Nominal Composition, pct	AMS Number	Jet Engine Component*	Welding Rod Recommended
Stellite 33	20.00 Cr, 20.00 Ni, 29.00 Co, 5.00 W, 10.00 Mo, bal Fe		Nozzle blades	Multimet (low C)
S-816	20.00 Cr, 20.00 Ni, 4.00 Mo, 4.00 W, 4.00 Co, bal Co	5755A	Turbine buckets	S-816
Stellite 21	27.00 Cr, 3.00 Ni, 5.00 Mo, bal Co	5385A	Turbine buckets, nozzle blades, power recovery buckets	Stellite 21
Stellite 23	26.00 Cr, 5.50 W, bal Co	5375	Turbine buckets	
Stellite 30	26.00 Cr, 50.00 Ni, 6.00 Mo, bal Co	5380	Turbine buckets	
Stellite 31	26.00 Cr, 10.00 Ni, 7.00 W, bal Co	5382A	Turbine buckets	
Stellite 34	High carbon Stellite 21		Turbine buckets	
Stellite 36	18.00 Cr, 14.00 W, 10.00 Ni, bal Co		Turbine buckets	

\* At present, there is a marked trend to use lower alloyed metals for specific jet engine parts to conserve the scarcer alloying elements. For example, Type 410 martensitic stainless steel (13.5 pct Cr) is widely used for components previously made of Group 1 Cr-Ni alloys. Such parts are located near the forward end of the jet engine where the air enters and is compressed. Type 410 will soon displace even more of the Group 1 Cr-Ni alloys while low-alloy steels such as N-A-X and Timken 17-22A (S) will replace Type 410 for other parts which will not be heated over 1000° F.

arc welding and reverse polarity dc or ac for submerged-arc welding are also recommended to relieve hot-cracking.

Type 304 (extra low C) base metal has excellent weldability with the rods listed for it in Table I. The hot-shortness of Type 330 alloy suggests the use of a lower nickel, Type 309 rod and the use of straight polarity dc for tungsten-arc welding, reverse polarity dc for inert gas-shielded metal-arc welding, and reverse polarity dc or ac for submerged-arc welding. The 25-20-2 alloy is normally used in sheet form and should be tungsten-arc welded using straight polarity dc.

Among the specialized alloys, Multimet (low C) or N-155 tends to be hot short above 1800°F during welding. Cracks about 1/8-in long usually form in the base metal adjacent and perpendicular to the weld. Compared to Multimet, the higher columbium and tungsten content of S-590 may give more difficulty with hot-cracking with all welding processes. The high nickel content of Refractalloy B and 26 requires the narrow stringer bead or multipass technique to avoid hot-cracking.

Considerable difficulty has been encountered with all processes when welding Inconel X in the age-hardened condition. Extensive cracking occurs in and near the weld unless it is welded in the annealed condition. Hastelloy W or Inconel rod is preferred to Inconel X or W rod because it gives a more ductile weld and thus helps prevent weld cracking. Inconel W has slightly lower strength but better ductility than Inconel X and is therefore less troublesome to weld.

The high nickel content of Nimonic 75 and 80 requires a greater flow of inert gas than the austenitic stainless steels during tungsten-arc welding. The gas flow should be about 25 cu ft per hr to minimize porosity. Hastelloy B and C also has a tendency toward porosity during tungsten-arc welding because of the high nickel and molybdenum content. The gas flow should be about the same as for Nimonic 75 and 80.

Hot-cracking may give some trouble with S-816 sheet because of the high tungsten and columbium content. The same precautions should be taken for this alloy and Stellite 25 as for Multimet.



TABLE II

### COMBINATIONS OF DISSIMILAR METALS AND RECOMMENDED WELDING RODS For Jet Engine Components

Base Metals	Welding Rod**
Type 410 to Inconel W and X	Inconel, Types 309, 310, 312
Type 347 to Type 347	Type 347, Oxweld No. 60, 312 rod (Unionmelt)
Type 347 and 310 to Multimet	Multimet, Hastelloy W, Types 312, 309 and 310
Type 314 to Type 314	Type 316, 312
Type 310 to Stellite 21	Hastelloy W, Types 312, 309, 310
Inconel to Hastelloy C	Nickel and Inconel
Inconel X to Stellite 21	Inconel, Hastelloy W, Types 312, 309 and 310
Type 410 to 310, 321, or 347	Types 312, 309, 310 or Inconel
Type 410 to 304	Types 304 and 410
Hastelloy B to Hastelloy C	Hastelloy W
Inconel W or X to Hastelloy B and C	Hastelloy W
S-816 to Timken 16-25-6	Hastelloy W or Types 316, 318, Inconel
Timken 16-25-6 to Stellite 30	Inconel, Hastelloy W
16-25-6 to Stellite 21	Inconel, Hastelloy W, Timken 16-25-6, Type 312
16-25-6 to Hastelloy C	
19-9DL to Stellite 30	Inconel, Hastelloy W, 19-9DL, Types 312, 316 and 318
S-816 to Type 501	Hastelloy W, Inconel, Types 312, 316, 318, 309, 19-9 WMo, 310
16-25-6 to Type 501	Inconel, Types 312, 316, 318, 16-25-6, 309, 310
16-25-6 to 4340	Hastelloy W, Inconel, Type 312, 309, 316, 318, 310, 16-25-6
Multimet to Type 316	316 (extra low C), 318, Multimet (low C), 316, 309, 312
Multimet to Stellite 23 and 30	Hastelloy W

\*\* Welding rod sometimes varies for different processes.

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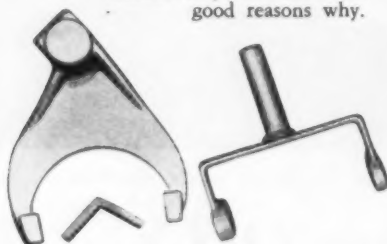
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- Machining facilities for milling, drilling, turning and broaching... and complete die sinking facilities.
- A reputation for designing, engineering and forging even the toughest jobs to a high degree of accuracy.

Investigate all of the advantages you can receive when you look to Williams for Drop-Forgings. Your inquiry will receive prompt attention.

**Be Wise . . . Buy  
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**J. H. WILLIAMS & CO.**

484 Vulcan Street

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## Technical Briefs

Engineering

### BEARINGS:

System helps select smallest bearing for desired bearing life.

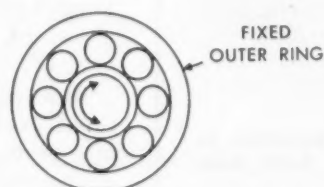
Extreme speeds attained by modern aircraft have outmoded many design and development principles used in slower planes.

One of these principles, selection of airframe control bearings, has been under study for several years to develop new criteria for rating airframe control bearings, which would more closely simulate flight conditions.

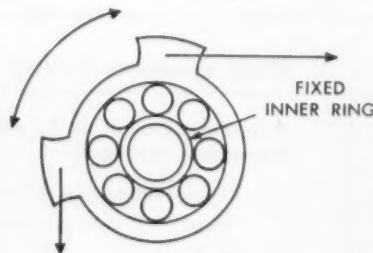
**Rating Methods** — Heretofore, control bearings have been rated and selected on the basis of static non-Brinell value required to exceed the critical limit load on the control positions.

The non-Brinell value was determined by a formula  $KNd^3$  where  $N$  was the number of balls,  $d$  the ball diameter in inches, and  $K$  a constant, values of which were 5000 to 5500 for deep groove bearings and 2400 to 2800 for self-aligning bearing types.

**Ignored**—Not considered are factors as normal or combined loads, differences in applications, and cycles of oscillation. Often this entailed added weight and expense



CASE I



CASE II

**RADIAL LOAD RATINGS** are based on an average life of 10,000 90° cycles with values where the load is fixed with respect to the outer race (Case I) and the inner race (Case II).

### IF YOU WANT MORE DATA

You may secure additional information on any item briefed in this section by using the reply card on page 67. Just indicate the subject heading and the page on which it appears. Be sure to note exactly the information wanted.

since the available capacity or life of a bearing was seldom fully utilized.

**Higher Load**—In developing the new method of selecting bearings for airframe use, it was determined that static loading, considerably in excess of the non-Brinell loads, could be applied without affecting the smooth operation or life under loads and oscillatory motion.

This allowable static load which is nearly twice that of the old non-Brinell loads is equivalent to a  $K$  factor of about 10,000 for deep groove bearings, 3800 for self-aligning bearings, and 3200 for rod end bearings. Designated as "Limit Load Rating," it never exceeds two-thirds of the bearings' minimum static fracture strength.

**Selection** — By load-life data which are presented as "Radial Load Ratings," the new system permits the selection of the smallest bearing which will operate satisfactorily for the desired life.

Radial load ratings for any number of oscillations other than 10,000 cycles can be calculated by multiplying the basic 10,000 cycle rating by a life factor obtained from a life factor curve.

The formulas for the ratings and life factors were derived from data compiled from tests conducted by Fafnir Bearing Co., New Britain, Conn., and reviewed in *The Dragon*.



## RESISTANT:

Shut down time reduced by use of acid resistant stainless.

A special corrosion resistant stainless steel proved it could overcome an unusually severe type of attack recently when it resisted hot sulfuric acid in a West Virginia firm.

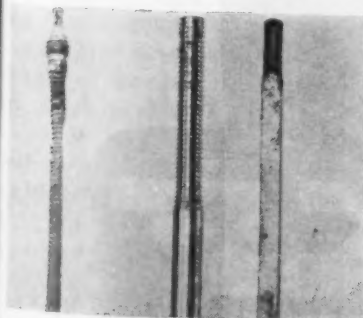
Rods made from this steel resisted sulfuric acid solutions up to 68 pct strength at 158° F. And they have been in the company's service 3747 hr of a possible 6144 hr over a period of 256 days.

**Concentrated**—The steel used, Carpenter Stainless No. 20, Carpenter Steel Co., Reading, Pa. In operation, the ½ in. sq rods handled about 50 gal of H<sub>2</sub>SO<sub>4</sub> a minute in full range of the solution from 0 to 58 pct concentration.

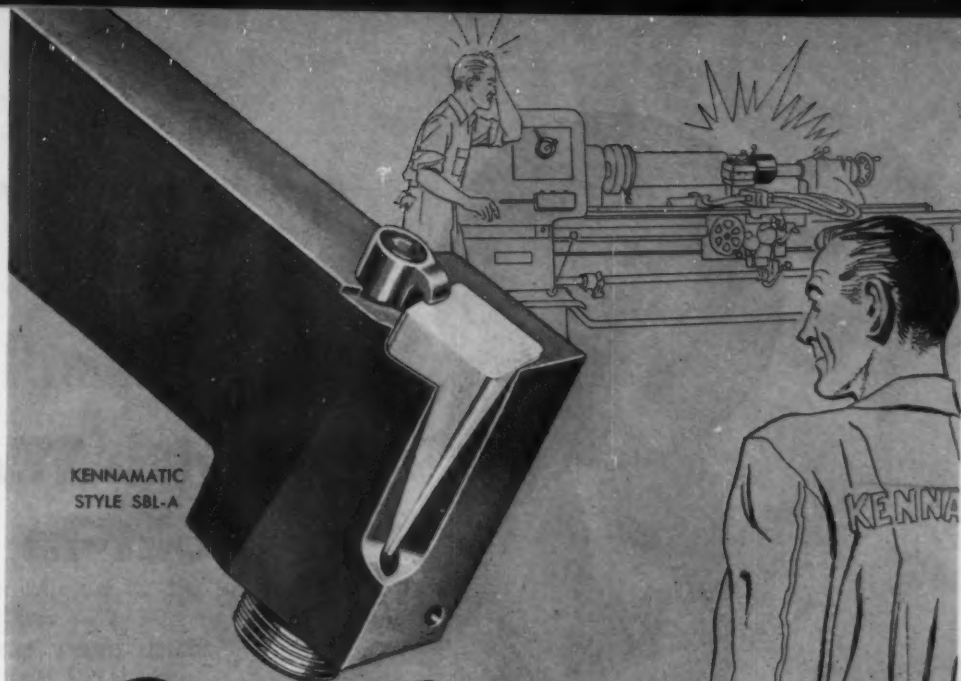
At the same time the company installed the stainless No. 20 rods, it also included one-half inch round rods of stainless type 316 in the same application.

**Shut Down**—Eight rods failed 4 days later, and the unit was shut down. Examination showed that all the rods that had failed were made from type 316.

While type 316 can be used successfully for certain dilute solutions of H<sub>2</sub>SO<sub>4</sub> at low temperatures and many other corrosive agents, it was not satisfactory with the high temperature and under the wide range of concentrations encountered in this application.



FOUR DAYS in sulfuric acid in concentrations to 58 pct left little of type 316 stainless rod, left, compared with original, center. At right is NO.20 rod after 3747 hr service over 256 days in same application.



# Sure Cure for a CUTTING HEADACHE

If you have a cutting headache, caused by tool failure, take this three-way cure:

- (1) Use Kennametal cemented carbide . . .
- (2) in tooling designed by our engineers who know carbides from the ground floor up . . .
- (3) applied with the help of our field engineers whose aggregate experience is greater than that of any other carbide tool manufacturer.

This cure is working in thousands of shops—handling jobs which no other tools can do. But, even if you don't have a cutting headache, consider this important point:

Tooling that takes tough jobs in stride is the kind to use, also, on routine jobs where floor-to-floor time and overall cost-per-piece must be determined with accuracy, and maintained.

That tooling is Kennametal. Let us prove it in your shop. Kennametal Inc., Latrobe, Pa.

# KENNAMETAL

CEMENTED CARBIDE TOOLING  
THAT INCREASES PRODUCTIVITY





tiny to  
giant-sized bearings

## with **TEAM-WORK** built-in every size

With every size in SKF's wide range of ball and roller bearings, you receive an extra quality—*team-work*. This is the ability of SKF field and home office engineers to cooperate productively with your equipment designers.

Helping to solve their bearing problems is the *extra* which all industries have learned to expect from SKF.



# SKF

BALL AND ROLLER BEARINGS

SKF INDUSTRIES, INC., PHILA. 32, PA. — manufacturers of SKF and HESS-BRIGHT bearings.

## Demand for Alloy Products Defies Early Testing

**High level expected to hold into second half . . . At least one source expects strength through the year . . . Defense orders unequally distributed . . . Ingot rate gains.**

Steelmakers still describe the market for their products as "lighter than a drum," and demand for alloy steel is threatening to split the seams. Strong points of demand, of course, are automotive and defense business. Barring a major reversal of these strong points, considered highly unlikely, alloy producers expect business to fill be at a strong level entering the second half. At least one important alloy source is optimistic for the entire year.

Such expressions of confidence in demand are usually taken at a little more than face value because steelmakers have seldom been known to be overly optimistic over the market outlook.

**Feeling Pressure**—Rated orders for alloy bars were slightly lighter for the second quarter than for the first, but this is believed due to temporary uncertainty over some new contract authorizations. There is a long waiting line standing by to grab off any open mill space that might show up.

Demand for aircraft bars and billets is very strong, order books being filled through the second quarter. There have been no cancellations of aircraft quality orders, though there have been some orders for tank and truck parts. The latter are believed to represent program changes, but the market is still too strong to react to spot curtailment.

**Try and Get It** — Some open space exists for openhearth alloys in May set-asides. Here, again, there are plenty of free-lance customers standing by hoping to get

a crack at it. The mill problem is likely to be one of deciding who shall get it rather than how to book the space.

Some alloy customers may be unable to find a home for second quarter tickets. One of the large alloy producers was able to accept only one-fifth of an order for aircraft quality alloy steel.

**Hungry Customer** — Warehouse demand for alloy steel is extremely strong. One warehouse offered to place a spot order for second quarter amounting to more tonnage than was shipped to him in the entire year 1952. About the only break on current warehouse ordering seems to be caution against overstocking alternate grades of steel in the event National Production Authority suddenly releases critical alloying material. This doesn't appear likely in the near future.

An IRON AGE check of big tonnage carbon steel items, bread and butter products of the industry, reflects no sign of easing demand. Bars, sheets, plate and pipe of any kind are still pursued by eager customers. Only soft spots at the moment are nails and merchant wire, both seasonal products.

**Don't Believe It**—A good many people in the steel industry believe that percentage set-asides for defense orders are too high on various products. They seem convinced, some for the first time, that set-asides for the second quarter will not be entirely taken up.

Another complaint frequently heard is that military set-asides do not hit all producers uniformly.

Depending on where they are located, some mills are forced to accept defense business to the limit on the set-asides, while other producers find their defense tonnage only partially taken up. Also, very little, if any, defense business is being placed with the premium-price producers. The military has the advantage of being able to buy from the lower-price producers. Of course this means that civilian customers have to buy the higher priced steel.

**Is This Hardship**—One important sheet producer added second quarter quotas for warehouses and for "further fabrication" to military set-asides for hot-rolled sheets and found that 60 pct of this item is slated for "must" categories. Additional ordering for the landing mat program is a factor here.

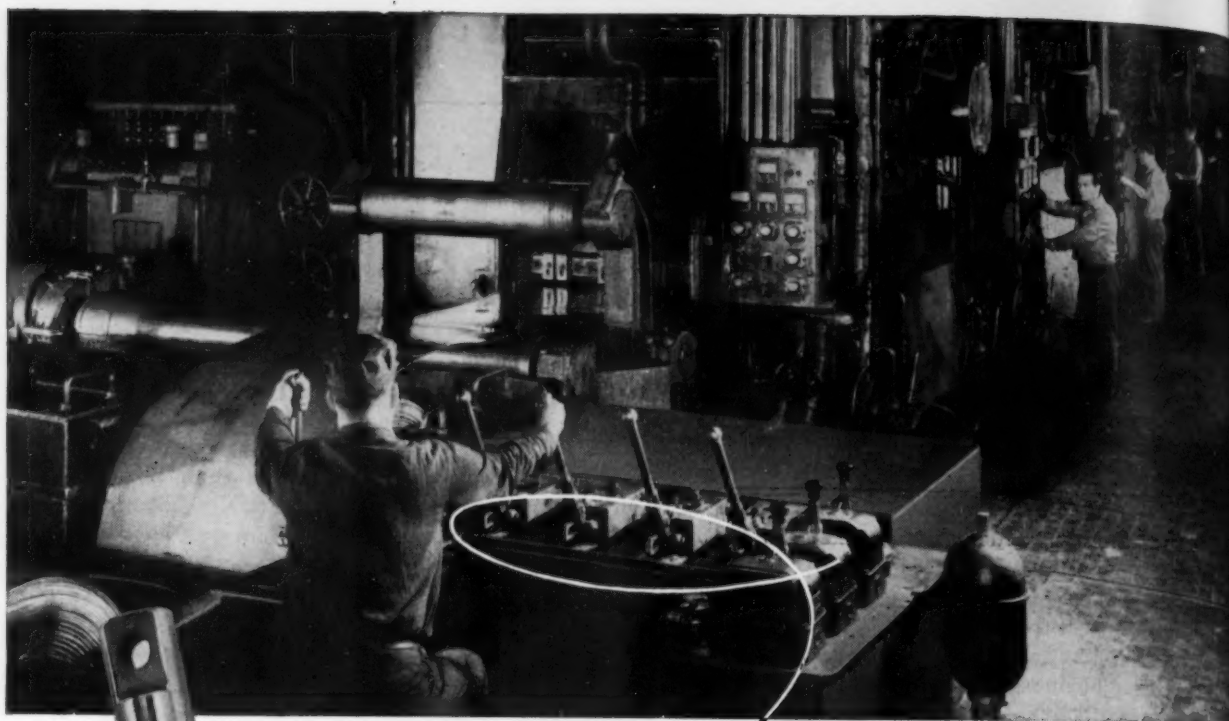
In another instance 80 pct of a bar producer's second quarter output is tied up by "must" categories. In this case a contributing factor is a special program calling for shell quality steel bars.

The above are obviously special examples, and do not at all reflect average experience. But, for that very reason, they point up the greatly varying impact of defense orders on different producers and different products.

**Ingot Rate Climbs** — The total "take" of military steel is not increasing. Rather it has tapered off from the post-strike high when mills were hit with heavy demands for make-up tonnage in addition to regular scheduled quotas.

Steelmaking operations this week are scheduled at 99.5 pct of rated capacity, up half a point from last week's revised rate. The strike at Kaiser's Fontana plant was settled quickly, with only minor loss of output.





Half-inch and three-quarter-inch plungers for Hunt "Quick-As-Wink" control valves are machined from Type 416 Free-Machining ENDURO Stainless Steel by C. B. Hunt & Son, Inc., Salem, Ohio.

## Free-Machining **ENDURO** Helps Control Stainless Machining Costs

In pneumatic and hydraulic control valves, ENDURO Stainless Steel plungers help boss big mills like this . . .

The ENDURO plungers—through which air, water, and oil flow under thousands of pounds pressure—must resist corrosion, resist abrasion, and maintain a tight seal at all times. They must be fully balanced so that they cannot creep or crawl.

All this requires a lot of machining . . . upwards of 30 separate operations. Free-Machining ENDURO Bars are cold finished by Republic's Union Drawn Division especially for efficient, economical production of all such highly-machined parts. They provide close tolerances, accuracy of section, uniform soundness, and fine surface finish, together with the high physical and chemical properties of stainless steel. Two grades are 90% as machinable as Bessemer screw stock.

Free-Machining ENDURO also is available in hot rolled bars, and in wire. Republic metallurgists are ready to give prompt assistance on applications, processing and use. Write:

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Alloy Steel Division • Massillon, Ohio  
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Export Department: Chrysler Building, New York 17, N. Y.



Other Republic Products include Carbon and Alloy Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

## Market Briefs and Bulletins

**Nickel Production**—Defense Materials Procurement Agency has negotiated an agreement by which the Hanna Nickel & Ore Corp. and Hanna Nickel Smelting Co. will undertake development and production of nickel ore from the only known major U. S. deposit in Oregon. Hanna will develop the mine on Nickel Mountain at its own expense, but the government will advance up to \$25 million for construction of smelting facilities. In return, Hanna will produce up to 47,500 tons of nickel for the government under a guaranteed graduated scale of prices.

**Plastics Pushing**—Reinforced plastics industry expects to increase its market 40 pct this year. Industry spokesmen believe 27 million lb of polyester plastics for reinforced products will be sold in 1953 as compared with 19 million lb last year and 14 million lb in 1951.

**Steel Export Quotas**—Office of International Trade has set a second quarter export quota of 757,000 short tons of carbon steel. In addition, 877 tons of stainless and 10,850 tons of alloy may also be exported during this period.

**Coke Prices Raised**—Producers of beehive oven coke and coal tar products have been authorized to increase prices an average of 6 pct. Permission for the price hike is contained in Amends. 14 and 15, Supplementary Reg. 13, General Ceiling Price Reg.

**Canadian Pig**—Canadian production of pig iron last November amounted to 225,490 net tons. Output was rated at 90.6 pct of capacity. For the first 11 months of 1952 production totaled 2,449,333 tons as compared with 2,332,113 for the same period in 1951.

**Rapid Rise**—Chester Lang, General Electric vice-president, predicted last week that the electrical industry will produce as much equipment in the next ten years as in the past 74 years. He also believes gross national product will increase 29 pct by 1961 and anticipates that national output of electric power will double in the next ten years.

**Zirconium Plant**—Rust Process Design Co., Pittsburgh, is designing a \$2.5 million plant for production of zirconium and hafnium metals for Carborundum Metals Co., Inc., Akron, N. Y. The plant is said to be the first designed for production of zirconium and hafnium in a commercial operation. Carborundum Metals Co., a new subsidiary of Carborundum Co., recently signed a 5-year contract with Atomic Energy Commission for yearly delivery of 150,000 lb of zirconium and hafnium sponge metals from the new plant.

**Aluminum Hike**—Price Stabilizer Michael DiSalle has been directed by Defense Mobilizer Henry Fowler to permit an increase in aluminum ceilings. The increase is ½¢ for primary pig and ingot, and 4 pct on fabricated and semi-finished aluminum. Tied to the boost are some much-revised alterations in the government's supply agreement with the Big Three producers. Mr. DiSalle was expected to sign the order this week.

**Ore Sales**—Black ore (manganese dioxide) as well as pink ore (manganese carbonate) is now being purchased at the government's depot at Butte, Mont. Shippers of less than 200 tons in a 30-day period will be paid flat rates from \$4.87 per long dry ton for 18 pct ore to \$51.62 for 39 pct ore. Shippers of larger quantities will get down payments on the same basis. But final settlement will be in terms of final manganese recovery.

## STEEL OPERATIONS

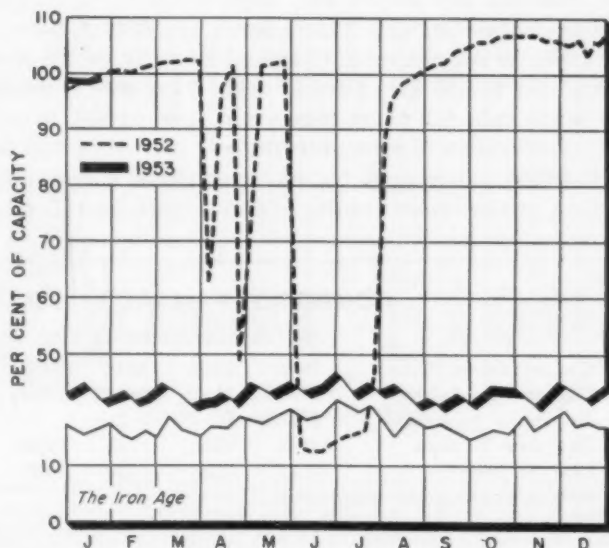


District Operating Rates

District	Week of Jan. 18	Week of Jan. 11
Pittsburgh	105.0	106.0*
Chicago	106.5	105.0
Valley	104.0	103.0*
Philadelphia	96.0	96.0*
West	106.0	101.5*
Buffalo	100.0	100.0
Cleveland	98.5	99.5
Detroit	106.0	106.0*
Wheeling	104.0	104.0*
Birmingham		
(South)	96.0	95.5
South Ohio River	95.5	93.5
St. Louis	100.0	93.0
East	99.0	95.0
Aggregate	99.5	99.0*

Beginning Jan. 1, 1953, operations are based on annual capacity of 117,547,470 net tons.

\* Revised



## Rains Restore Some Northwest Power

**Order cutting firm power rescinded . . . It means production hike of about 2900 tons monthly . . . Some interruptible may be restored . . . But losses are still heavy—By R. L. Hatschek.**

Hooray for the weather man! That's the cry heard throughout the aluminum industry as heavy rains and warm weather have raised the water level in the Pacific Northwest. The restrictions cutting off 10 pct of the aluminum producers' firm power in that area have been lifted with the result that output may be expected to jump approximately 2900 tons a month.

The industry as a whole had been losing about 20,000 tons of production monthly throughout the country. Most of this, about 16,800 tons a month, was due to the power shortage in the Northwest. Relief came first in the Southwest and with this restoration of electricity in the Northwest, losses are now running at something under 14,000 tons monthly—still considerable. But the outlook has definitely turned optimistic.

**Interruptible, Too—**Of the 110,000 kw of firm power restored to users in the area, Aluminum Co. of America got 20,000 kw; Reynolds Metal Co. got 23,000 kw; and Kaiser Aluminum & Chemical Corp. got 22,500 kw. Fact is that so much rain fell there may even be a restoration of some interruptible power.

One of the lesser results of the

power shortage was that Alcoa's fourth and last line at the new Wenatchee smelter was recently completed with absolutely no fanfare. This signalled the end of the first expansion round.

**Soaring Silver—**The silver market has been exhibiting some action lately — all upward. For 4 consecutive days last week Handy & Harman quoted a  $\frac{1}{2}\epsilon$  increase over the preceding day. The total  $2\epsilon$  increase carried the silver price from  $83\frac{1}{4}\epsilon$  per troy oz to  $85\frac{1}{4}\epsilon$  on Friday. The activity is attributed to extraordinary demand for the metal, considering the season.

In their roundup for 1952, Handy & Harman cited the drop in demand for silverware as the reason for the decline in consumption from 110,000,000 oz in 1951 to 95,000,000 oz in 1952. An even more severe drop was prevented by increased industrial use of silver for making both civilian and military products.

**Zinc Cut —**Despite optimism early in the month, the zinc market was trimmed to size last week when the price dropped to  $12\frac{1}{2}\epsilon$  per lb, a  $\frac{1}{2}\epsilon$  decline. There had been a disparity between the New York and London quotations

which forestalled even the possibility of confidence in the domestic price. Almost all business was being done on an average price basis.

But even the lower price didn't bring out much in the way of demand, though it did instigate some flat price business. General consensus in the trade is that no much demand will be in evidence until consumers start thinking about their February requirements. Some transactions were still being made at an average price basis.

**Buy Bolivian Tin—**Reconstruction Finance Corp. has just purchased tin concentrates from Bolivia estimated to contain 500 gross tons of metal at  $\$1.17\frac{1}{2}$  per lb f.o.b South American Port. The price is equivalent to  $\$1.21\frac{1}{2}$  delivered. It's the first purchase since the mines were nationalized and ore mined both before and after the nationalization are included.

Among the problems being considered, according to Bolivian ambassador Victor Andrade, is that of compensation for U. S. stockholders in the firms nationalized last November. Discussions on a 1-year purchase contract are also under way between the Bolivian and U. S. governments.

**Tariff Talk—**The House seems well on its way toward the annual affair of extending the copper import tariff suspension. The bill has been approved by the House Ways and Means Committee and is now awaiting action by the Representatives. Under its terms, the duty would be reinstated if the average copper price dropped below  $24\epsilon$  for a month. An amendment drops the provision that Presidential proclamation of the end of the emergency would automatically end the suspension.

Meanwhile, Rep. Emanuel Celler, D., N. Y., has introduced a bill which would temporarily suspend the import duty on aluminum.

### NONFERROUS METAL PRICES

	Jan. 14	Jan. 15	Jan. 16	Jan. 17	Jan. 19	Jan. 20
Copper, electro, Conn. . . .	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered . . .	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York . . .	$\$1.21\frac{1}{2}$	$\$1.21\frac{1}{2}$	$\$1.21\frac{1}{2}$	.....	$\$1.21\frac{1}{2}$	$\$1.21\frac{1}{2}$ *
Zinc, East St. Louis . . . . .	12.50	12.50	12.50	12.50	12.50	12.50
Lead, St. Louis . . . . .	13.80	13.80	13.80	13.80	13.80	13.80

Note: Quotations are going prices.  
\*Tentative.



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January 22, 1953

# Iron and Steel Scrap Markets

## Some Markets Are Just Idling Along

**Demand shows varying degrees of interest but generally it's not too high-pitched . . . Some softening in lower scrap grades . . . Some markets for turnings wobbly . . . Dealer intake low.**

Steel mill demand for scrap showed varying degrees of interest—but in several major centers interest was not overly high-pitched. Openhearth grades were moving well but some softening was detected in lighter grades of scrap.

In Pittsburgh consumers were indifferent towards deliveries, reflecting still heavy stockpiles. The market for turnings and cast continued wobbly. The Chicago market was generally easy and Detroit reported some easing with turnings sagging.

Birmingham brokers reported orders for heavy melting from the North have slipped and inspectors are becoming eagle-eyed. Cleveland consumers were also inspecting more rigidly and Cincinnati buyers were content to coast along.

Some dealers continued to report low intake of scrap and low stockpiles. The scrap flow in these sections is regarded as insufficient to permit stockpiling—and considering that prices are solid, the situation is puzzling.

At last week's convention the national officers of the Institute of Scrap Iron & Steel for 1952 were re-elected for 1953. They are: president, Ralph E. Ablon, Luria Bros. & Co., Inc., New York; first vice-president, David C. Holub, Holub Iron & Steel Co., Akron, Ohio; second vice-president, C. C. Cohen, I. J. Cohen & Co., Inc., Kansas City, Mo.; secretary, Myron L. Chase, Luntz Iron & Steel Co., Canton, Ohio; treasurer, Samuel G. Keywell, The Samuel G. Keywell Co., Inc., Detroit, Mich. Edwin C. Barringer continues as executive vice-president.

**Pittsburgh** — The market has become tighter on better grades of scrap. Supply of lower grades is more than adequate. Market for turnings

and cast continues soft. Consumers are indifferent toward deliveries. As a result it is likely that present high inventories will slide off in coming months.

**Chicago** — While scrap movement generally last week was not high, there was again evidence of some hope in the cast market. Turnings continued to clutter the market, with some buyers feeling that a little waiting would bring better prices. Locomotive sales at \$47.50 per gross ton were reported. Sales in cupola, for instance, were reported at \$1 over last week's price.

**Philadelphia** — Fog shrouded this district early this week and no trucking was being done on Monday. The market is not much changed but there is word of possible lower tonnages expected to change hands next month. Practically all mills in the area have been taking in more scrap than they are charging. Consumers are a bit fussier on quality of blast furnace grades—short shovelings have to be just that.

**New York** — The market is firm on the important grades. Important in this district is the scarcity of scrap coming into dealers' yards. At first it was thought the only reason for low dealer inventories was the rush to ship last year but a continuation of the affliction indicates that the scrap flow is not heavy enough to permit dealer stockpiling. Mills nevertheless can get all the scrap they need.

**Detroit** — A slight easing of the market was observed in the past week with turnings showing definite signs of weakness. Mild weather has helped mills here build up inventories but openhearth and electric grades are still strong. Inspection is becoming more rigid, particularly at the electric furnace level. Because of precariously low inventories a short time ago it was very loose.

**Cleveland** — District and Valley mills have been releasing shipments in greater volume but their buying is selective and on limited springboards. Trend seems to be toward more rigid inspection with No. 2 bundles slated for closer attention. Some dealers are looking forward to a strong second quarter. If it develops low yard inventories may pose a problem. Electric furnace grades are still in demand while cast and malleable remain weak.

**Birmingham** — Brokers report orders for heavy melting from northern mills have slowed down since the first of the year. They say this probably is due to the fact that many dealers who received orders in December did not make shipments until after Jan. 1, possibly for tax purposes. Cast market continues slow.

**Cincinnati** — Buyers here are generally content to maintain comfortable inventories and there is little or no upgrading. But an undercurrent of market strength is reflected in steady flow of good openhearth scrap and increased availability of rails and specialties. Spot orders of good blast furnace scrap can be moved at ceiling but the traffic isn't heavy. Cast market is dull.

**Buffalo** — Drastic shrinkage in new scrap receipts is reported by dealers. Receipts are not sufficient to keep dealers' yard presses busy. One of the top mills is forced to dip into reserve stock to maintain production. Cast market continues wobbly with little or no buying interest.

**Boston** — While the snow is gone from southern New England and business has returned to normal, Maine and northern Vermont have been getting steady snow. Result in that area is a complete standstill of the scrap trade. Boston is enjoying a good market on steel grades but cast demand is pretty flat.

**West Coast** — Scrap men returned from the New York convention were amazed at the activity of the Eastern market compared with their own low-ceiling operations. They also presented a resolution asking export permits but its chances appeared slight due to ceiling prices everywhere else. Meanwhile market conditions largely unchanged. Cast slipped another dollar to \$40 in Seattle.